AD-A092 452 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. PATTERSON BRIXIUS GREY CREEK WATER--ETC(U)
SEP 80 G KOCH DACW51-79-C-0001

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1 OF 2
AD A092452

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Visual Inspection
Hydrology, Structural Stability
Patterson Brixius Grey Creek Watershed Project
Site 2
Broome County
Brixius Creek

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and visual inspection of the Site 2 Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

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The discharge capacity of the spillways is adequate for the PMF (Probable Maximum Flood).

The following remedial actions must be completed within 1 year from notification to the owner:

1. Eliminate the pedestrian traffic on the embankment and auxiliary spillway, backfill all depressions and reseed these areas.

2. Repair the depressions on the upstream slope in the vicinity of the riser and beyond the downstream toe of the dam. Reseed as required.

3. Remove the parking area from the auxiliary spillway channel and reseed the affected area.

4. Remove the vegetation from the inlet and outlet of the auxiliary spillway, and the downstream channel. Provide a program of periodic cutting and mowing of the dam and appurtenant surfaces.

5. Investigate the conditions of the reservoir drain and restore to operational status, if required.

6. Repair the erosion or the Taft Road embankment and clean out the sediment within the 6 feet diameter highway culvert.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
PATTERSON, BRIXIUS, GREY CREEK WATERSHED PROJECT
SITE 2
I.D. No. NY 725
DEC #86D-3919
SUSQUEHANNA RIVER BASIN
BROOME COUNTY, NEW YORK

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam	Patterson Brixius Grey Creek Watershed Project Site 2 I.D. No. NY 725
State Located	New York
County Located	Broome
Stream	Brixius Creek (tributary of Susquehanna River)
Date of Inspection	July 23, 1980

ASSESSMENT

The examination of documents and visual inspection of the Site 2 Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property.

The discharge capacity of the spillways is adequate for the PMF (Probable Maximum Flood).

The following remedial actions must be completed within 1 year from notification to the owner:

1. Eliminate the pedestrian traffic on the embankment and auxiliary spillway, backfill all depressions and reseed these areas.
2. Repair the depressions on the upstream slope in the vicinity of the riser and beyond the downstream toe of the dam. Reseed as required.
3. Remove the parking area from the auxiliary spillway channel and reseed the affected area.
4. Remove the vegetation from the inlet and outlet of the auxiliary spillway, and the downstream channel. Provide a program of periodic cutting and mowing of the dam and appurtenant surfaces.
5. Investigate the conditions of the reservoir drain and restore to operational status, if required.
6. Repair the erosion or the Taft Road embankment and clean out the sediment within the 6 feet diameter highway culvert, AND
7. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also develop an emergency action plan.

George Koch

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved By:

Colonel W. M. Smith Jr.
New York District Engineer

Date: 30 Sep 88

Photo #1
Overview of Patterson Brixius Grey Creek
Watershed Project - Site 2

PHASE I INSPECTION REPORT
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SITE 2
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SUSQUEHANNA RIVER BASIN
BROOME COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Site 2 Dam consists of a 730 feet long homogeneous earth embankment with an auxiliary spillway beyond the right abutment of the embankment, located in a cut section. The maximum height of the dam is 30 feet. The embankment has a crest width of 14 feet, and upstream slope of 1 vertical on 3 horizontal, and a downstream slope of 1 on 2.5. A 10 feet wide berm was constructed in the upstream slope in the vicinity of the principal spillway.

The auxiliary spillway is a vegetated earth channel, having a bottom width of 500 feet. The service spillway is a drop inlet structure consisting of a single-stage reinforced concrete riser, 30 inch diameter concrete pipe and plunge pool.

An internal drainage system is located under the downstream portion of the embankment to control the phreatic surface and provide a safe outlet for foundation seepage.

b. Location

The dam is located on Brixius Creek, a tributary of the Susquehanna River, approximately 1/2 mile north of Union, NY.

c. Size Classification

The dam is 30 feet high and is classified as "small" in size (less than 40 feet in height).

d. Hazard Classification

The dam is classified as high hazard, because of its location above Union, NY.

e. Ownership
The dam is owned and operated by the County of Broome, NY.

f. Purpose of the Dam
The dam is a flood water retarding structure.

g. Design and Construction History
The dam was designed by the U.S.D.A., Soil Conservation Service (SCS) construction of the dam was completed in 1973. The SCS office for Broome County, located at the Broome County Airport, has all design and construction information.

h. Normal Operating Procedures
Normal flows are discharged through the principal spillway. The structure has sufficient capacity to store and discharge a 100 year flood without use of the auxiliary spillway. Flow in excess of the 100 year storm will be discharged through the auxiliary spillway.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)	1.34
b. Discharge at Dam (cfs)	
Total at Top of Dam	9682.
Principle Spillway at Auxiliary Spillway Crest El.	109.
Reservoir Drain at Principle Spillway Crest El.	12.
c. Elevation (ft., USGS Datum)	
Top of Dam	941.6
Auxiliary Spillway Crest	936.8
Principle Spillway Crest	922.3
Reservoir Drain Invert El.	915.6
d. Reservoir (Acres)	
Surface Area at Top of Dam	41.3
Surface Area at Auxiliary Spillway Crest	30.0
Surface Area at Principle Spillway Crest	3.0
e. Storage Capacity (acre feet)	
Top of Dam	357.1
Auxiliary Spillway Crest	187.6
Principle Spillway Crest	10.9
f. Dam	
Type: Homogeneous earth fill.	
Length (ft.)	730.
Slopes upstream:	3:1
downstream:	2.5:1
Crest Width (ft):	14

g. Principle Spillway
Type: Single stage, reinforced concrete drop inlet.

Weir length (ft.)	15.0

h. Auxiliary Spillway
Type: Vegetated earth channel.

Bottom Width (ft.)	400.0
Side Slopes:	3:1
Exit Slope:	0.032 ft./ft.

i. Reservoir Drain
Type: 12" cast iron conduit emptying into principle spillway.

Control: Manually operated slide valve located in drop inlet.

SECTION 2: ENGINEERING DATA

2.1 GEOLOGY

The Patterson, Brixius, Grey Creek Watershed Project Dam No. 2 is located in the glaciated portion of the "Appalachian Uplands" (northern extreme of the Appalchian Plateau) physiographic province of New York State. These uplands were formed by dissection of the uplifted but flat lying sandstones and shales of the middle and upper Devonian Catckill Delta. The plateau surface is represented by flat-topped divides with drainage generally southwest toward the Susquehanna River system.

Glacial cover is generally thin, although some north-south valleys are so thick that they are completely buried. The present surficial deposits have resulted primarily from glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation, approximately 11,000 years ago.

2.2 SUBSURFACE INVESTIGATION

A subsurface investigation was conducted by the Soil Conservation Service in 1969. This program consisted of 12 drill holes and 24 test pits at locations along the dam, auxiliary spillways, structural elements, and borrow area. Applicable subsurface information is included in Appendix F.

In general, the foundation (in the flood plain) consists of a shallow, alluvial layer (GC-GP), over a layer approximately 25 feet thick of lacustrine silt (ML), over a layer of silty and clayey glacial till (ML-CL). The abutment areas consist of this glacial till.

2.3 EMBANKMENT AND APPURTENANT STRUCTURES

The dam was designed and constructed under the supervision of the Soil Conservation Service. "As-Built" drawings of this dam are on file at the SCS office in Broome County. Selected drawings of the dam and appurtenances are included in Appendix F. The dam is composed of homogeneous earth fill, the maximum height of which is 30 feet, a cut-off trench having side slopes of 1 on 2, and a foundation drain parallel to the axis of the dam near the downstream toe. A reinforced concrete riser serves as the principal spillway and a vegetated channel serves as the auxiliary spillway.

2.4 CONSTRUCTION RECORDS

Complete construction records are available from the SCS office in Broome County. No major construction changes were instituted.

2.5 OPERATION RECORD

Since the dam is an ungated floodwater retarding structure, no operating records are maintained regarding water levels. During periods of extreme rainfall, SCS personnel do monitor the reservoir.

2.6 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from Mr. Gary Page, Project Engineer for SCS in Broome County, and Mr. Donald Lake, Head of the SCS Design Section in Syracuse, New York. This information appears to be adequate and reliable for Phase 1 Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Site #2 Dam was conducted on July 23, 1980. The weather was cloudy and the temperature ranged in the 70's. The reservoir level at the time of the inspection approximated the crest elevation of the service spillway riser (El. 922.3).

b. Embankment

No signs of distress were observed in connection with the earth embankment and no signs of misalignment sloughing, seepage, subsidence, surface cracking, on undersireable growth were noted. While no riprap was in use on the upstream slope for wave protection, no erosion was apparent. (See Photo #1)

Pedestrian paths were noted on the crest and slopes of the embankment, below the embankment and on the slopes of the auxiliary spillway. (See Photos #1 thru 4)

An area approximately 10 feet long on the upstream slope, adjacent to the service spillway riser, was depressed and a small surface crack was noted. This appears to have been caused by pedestrian traffic.

An internal drainage system composed of 2 - 8 inch diameter pipes surrounded by "drain fill" and extending parallel to the axis of the dam, provides drainage at the embankment-subgrade contact. These pipes exit through the embankment adjacent to the service spillway conduit. No discharge was apparent from these pipes.

c. Spillways

The service spillway is in good condition. The maximum joint extension of the pipe is 1.0 inches.

The grass lined auxiliary spillway beyond the right abutment is generally in good condition. Two ball fields were noted in the channel, and on adjacent parking area had been extended into the channel. Pedestrian paths were also observed on the left slope, and vegetation was evident at the inlet and outlet of the channel. (See Photo #4)

d. Reservoir Drain

The reservoir drain, the controls of which are located within the service spillway riser, was not operated because the proper key was not available.

e. Downstream Area

Approximately 20 feet below the toe of the dam on the right side of the service spillway conduit, a depression was noted. This depression was a maximum of 2 feet deep and in excess of 4 feet long. No evidence of seepage or ongoing erosion was observed, and the cause of the depression is unknown. (See Photo #6)

The downstream channel is riprapped immediately below the service spillway outlet, but the remainder of the channel is heavily vegetated and constricted. (See Photo #5) Homes were noted approximately 100 feet below the dam.

f. Reservoir

There are no signs of instability within the reservoir. Erosion of the embankment slopes on Taft Road (which traverses the reservoir) was noted. In addition, it appears that this erosion has created a sedimentation problem in which 80 to 90% of the 6 feet diameter culvert pipe beneath the embankment is plugged with sediment. (See Photo #7)

3.2 EVALUATION

The problem areas observed during the inspection and the required remedial measures are as follows:

1. Pedestrian traffic has created paths and depressions on the slopes and crest of the embankment, at the abutments, on the slope of the auxiliary spillway, and an area immediately below the toe of the dam. This traffic must be eliminated, the depressions filled, and the areas reseeded to prevent erosion.

2. The depression and surface crack noted on the upstream slope in the vicinity of the riser must be repaired and monitored to determine if movement is ongoing.

3. The parking area, which is encroaching on the auxiliary spillway channel must be relocated.

4. Trees and vegetation was observed in the inlet and outlet of the auxiliary spillway and in the downstream channel. This vegetation must be removed. Provide a program of periodic cutting and mowing of the surfaces of the dam and appurtenances.

5. Backfill the depression noted on the right side of the service spillway conduit beyond the toe of the dam. Monitor this area for signs of ongoing erosion.

6. The reservoir drain could not be operated at the time of the inspection. Investigate this condition and restore, if necessary, to operating condition.

7. The erosion and subsequent sedimentation which was noted in the highway culvert beneath Taft Road is plugging the pipe. This sediment must be removed.

8. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information for future reference. Also, develop an emergency action plan.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal water surface elevation is approximated by the crest of the service spillway riser. Downstream flows are limited by the 30 inch diameter service spillway pipe, except during extremely heavy runoff when the auxiliary spillway is in service.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the County of Broome, New York. Maintenance of the dam is considered unsatisfactory as evidenced by the pedestrian paths, vegetation in the auxiliary spillway and downstream channels, and the depressions of the upstream slope and beyond the downstream toe.

4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

4.4 EVALUATION

The dam and appurtenant structures have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection."

SECTION 5: HYDRAULICS/HYDROLOGY

5.1 DRAINAGE AREA CHARACTERISTICS

The Patterson Brixius Site No. 2 is located on the Brixius Creek a tributary of Susquehanna River. The drainage area contributing to the site is 1.34 square miles. The watershed consists of highly populated area intersperced with woods and fields. Relief ranges from moderate to steep.

5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers' HEC-1 computer model. The Unit Hydrograph was defined by the Snyder Synthetic Unit Hydrograph method and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation was 21.0 inches (24 hr., 200 sq. mi.) from Hydrometeorological Report No. 33. Several floods were selected (%'s PMF) for analysis in accordance with recommended guidelines of the Corps of Engineers. The PMF inflow of 2829 cfs was routed through the reservoir, and the peak outflow was determined to be 2814 cfs.

5.3 SPILLWAY CAPACITY

The service spillway consists of a 2.5 x 7.5 feet drop inlet structure (15.0 feet weir length) emptying into a 30 inch diameter reinforced concrete pipe. A riprap lined plunge pool is located at the toe of the dam for energy dissipation. The capacities at auxiliary spillway crest and top of dam are 109 cfs and 9,682 cfs respectively. The auxiliary spillway is an earth cut on the right abutment, with a bottom width of 400 feet.

5.4 RESERVOIR CAPACITY

The reservoir capacities at the crest of the service spillway and emergency spillway crest are 10.9 and 187.6 acre feet respectively. Total storage to top of dam is 357.1 acre feet. Surcharge storage available from service spillway crest and top of dam is 346.2 acre feet or 4.73 inches runoff from the basin.

5.5 FLOODS OF RECORD

The highest reported reservoir elevation was 926.5 or 4.2 feet over the crest of the service spillway. This event occured September 1975, the estimated outflow was 100 cfs.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway is 9682 cfs before overtopping of the dam would occur. This capacity results in the ability to pass the full PMF of 2929 cfs, and greatly attenuate storms of lesser magnitude.

5.7 EVALUATION

The spillway is adequate to pass the full PMF, with approximately 2.7 feet of freeboard.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observation
No signs of distress were observed in connection with the earth embankment.

b. Design and Construction Data
A stability analysis was conducted by SCS during the design of the dam. The analyses were performed using the modified sweedish circle method. The soil parameters assumed were:

1. Foundation: γ_d =101.1, γ_{sat}=127.5, γ_{sub}=65.0, ϕ=165^0 and c=1300

2. Embankment: γ_d=105.9, γ_{sat}=129.0, γ_{sub}=66.5, ϕ=26.5 and c=625

The results of these analyses are as follows:

Condition	Minimum Factor of Safety
1. Upstream Slope = 1:3, full drawdown no berm	2.8
2. Downstream Slope = 1:2.5 steady state seepage Drain @c/b=0.6 no berm	2.8

The calculated factors of safety for this dam are in excess of the minimum factors recommended by the Corps of Engineers. The dam is, therefore, considered to have adequate factors of safety for stability. Further information concerning this analysis is included in Appendix E.

c. Post Construction Changes
No post construction changes were initiated. Removable fences for sporting activities have been installed in the auxiliary spillway.

d. Seismic Stability
The dam is located in seismic Zone 1. Therefore, a seismic analysis is not warrented.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I Inspection of the Patterson Brixius Grey Creek Watershed Project Site 2 Dam did not reveal conditions which constitute a hazard to human life or property. The earth embankment is not considered to be unstable and appears capable of retarding floodwaters resulting from the PMF.

b. Adequacy of Information

The information reviewed appears adequate for Phase I Inspection purposes.

c. Additional Investigation

No additional investigation is required at this time.

d. Urgency

Within 1 year of notification to the owner, the following remedial measures must be completed.

7.2 RECOMMENDED MEASURES

1. Eliminate the pedestrian traffic on the embankment and auxiliary spillway, backfill all depressions and reseed these areas.

2. Repair the depressions on the upstream slope in the vicinity of the riser and beyond the downstream toe of the dam. Reseed as required.

3. Remove the parking area from the auxiliary spillway channel and reseed the affected area.

4. Remove the vegetation from the inlet and outlet of the auxiliary spillway, and the downstream channel. Provide a program of periodic cutting and mowing of the dam and appurtenant surfaces.

5. Investigate the condition of the reservoir drain and restore to operational status, if required.

6. Repair the erosion on the Taft Road embankment and clean out the sediment within the 6 feet diameter highway culvert.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system. Document this information from future reference. Also develop an emergency action plan.

APPENDIX A

PHOTOGRAPHS

Photo #2
Crest of Embankment

Photo #3
Downstream Slope

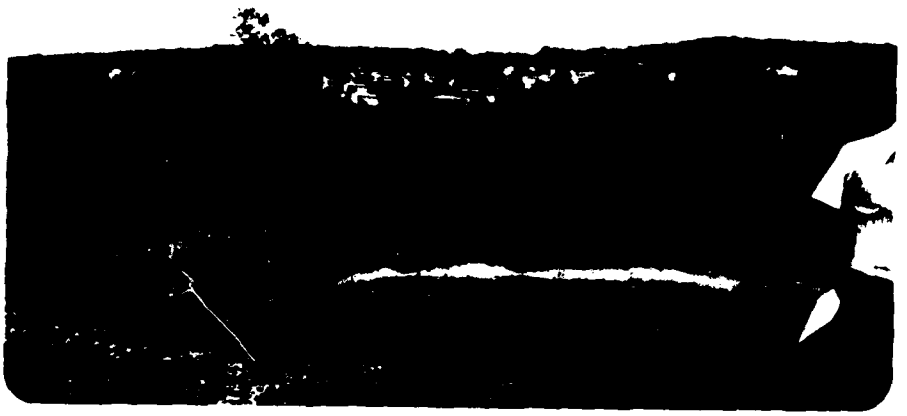


Photo #4
Right Abutment & Auxiliary Spillway

Photo #5
Plunge Pool & Downstream Channel

Photo #6
Depression Beyond Toe of Dam

Photo #7
Reservoir Area & Taft Road

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Pathfinder Bridges Corp Ck. Str #2

Fed. I.D. # NY 725 DEC Dam No. 88 D - 3919

River Basin Susquehanna

Location: Town Union County Broome

Stream Name Bevins Creek

Tributary of Susquehanna River

Latitude (N) 42° 7.3' Longitude (W) 76° 2.5'

Type of Dam homogeneous earth

Hazard Category "C" High

Date(s) of Inspection July 23, 1980

Weather Conditions cloudy 70's

Reservoir Level at Time of Inspection at Spillway crest (El. 922.3)

b. Inspection Personnel J.C. Veitch, R.P. McCarty

c. Persons Contacted (Including Address & Phone No.)

Gary Page - Proj. Engr. SCS Binghamton (607) 773-2751

Broome County Airport

Dawn's Lake SSS Syracuse Off. (315) 423-5505

d. History:

Date Constructed 1973 Date(s) Reconstructed *

Designer SCS

Constructed By N.A. Caruso & Sons Inc.

Owner Broome County

2) Embankment

a. Characteristics

(1) Embankment Material Clean Fill & Crushed

(2) Cutoff Type earth

(3) Impervious Core None

(4) Internal Drainage System 2 8" pipes w/ drain fill

(5) Miscellaneous

b. Crest

(1) Vertical Alignment good

(2) Horizontal Alignment good

(3) Surface Cracks none

(4) Miscellaneous heavy pedestrian traffic has destroyed vegetation

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1 : 3

(2) Undesirable Growth or Debris, Animal Burrows none

(3) Sloughing, Subsidence or Depressions Depression near toe pedestrian traffic also erosion crack = 10' long

(4) Slope Protection none

(5) Surface Cracks or Movement at Toe See 2 c 2

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 : 2.5

(2) Undesirable Growth or Debris, Animal Burrows none

(3) Sloughing, Subsidence or Depressions depression beyond toe see Section 6 .. depression from pedestrian traffic

(4) Surface Cracks or Movement at Toe none

(5) Seepage none

(6) External Drainage System (Ditches, Trenches; Blanket) none

(7) Condition Around Outlet Structure good

(8) Seepage Beyond Toe none - depression see Sketch 6

e. Abutments - Embankment Contact

(1) Erosion at Contact none
vegetation growth has caused loss of veg.

(2) Seepage Along Contact none

3) Drainage System

a. Description of System 2 - 8" pipes surrounded by earth fill parallel to dam axis

b. Condition of System good

c. Discharge from Drainage System none

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

none

5) Reservoir

a. Slopes good

b. Sedimentation in 6' diam pipe under Taft Road - 80-90% full of sediment

c. Unusual Conditions Which Affect Dam impounding of water by plugged pipe will result in overtopping of road in heavy storm

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) houses ≈ 1000' below dam

b. Seepage, Unusual Growth cattails & vegetation in channel

c. Evidence of Movement Beyond Toe of Dam depression 2' deep & 4+' long ≈ 20' from toe & right of service conduit cause unknown

d. Condition of Downstream Channel area now dry constructed w/ vegetation

7) Spillway(s) (Including Discharge Conveyance Channel)

a. General standard SCS service w/ grass auxiliary at right abut.

b. Condition of Service Spillway good
mod yard extension 1" - (2½ max allowable)
plug pool in good shape

c. Condition of Auxiliary Spillway vegetation in inlet of outlet of channel, parking area extended into channel bottom

d. Condition of Discharge Conveyance Channel ball fields in channel bottom w/ remnants backstops etc.

8) Reservoir Drain/Outlet

Type: Pipe 1 Conduit _____ Other _____

Material: Concrete _____ Metal 1 Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable N

Material: —

Joints: — Alignment —

Structural Integrity: —

Hydraulic Capability: _____

Means of Control: Gate ↘ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other not operable

Present Condition (Describe): Key not available to operate

9) Structural

a. Concrete Surfaces none

b. Structural Cracking none

c. Movement - Horizontal & Vertical Alignment (Settlement)

none

d. Junctions with Abutments or Embankments

good

e. Drains - Foundation, Joint, Face

internal drains - good condition, no flow

f. Water Passages, Conduits, Sluices

good condition

g. Seepage or Leakage none

h. Joints - Construction, etc. good condition

i. Foundation unknown

j. Abutments N A

k. Control Gates not operated - lock & key

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool, etc.) plunge pool riprap
good condition

n. Intake Structures standard single stage riser
good condition

o. Stability appears adequate

p. Miscellaneous

APPENDIX C

HYDROLOGIC / HYDRAULIC

ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	941.6	41.	357.
2) Design High Water (Max. Design Pool)	938.6	35.	242.
3) Auxiliary Spillway Crest	936.8	30.	188.
4) Pool Level with Flashboards	—	—	—
5) Service Spillway Crest	922.3	3.	11.

DISCHARGES

	Volume (cfs)
1) Average Daily	1-2.
2) Spillway @ Maximum High Water	9682.
3) Spillway @ Design High Water	2065.
4) Spillway @ Auxiliary Spillway Crest Elevation	109
5) Low Level Outlet @ Normal ≅	12
6) Total (of all facilities) @ Maximum High Water	9700
7) Maximum Known Flood	100.
8) At Time of Inspection	0.5

CREST: ELEVATION: 941.6

Type: Homogeneous earth fill

Width: 14' Length: 730'

Spillover drop inlet, emergency spillway

Location center embankment, right abut.

SPILLWAY:

SERVICE		AUXILIARY
922.3	Elevation	936.8
reinf. conc. drop inlet	Type	grass lined trap. channel
15' weir length	Width	400'
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
—	Type (Flashboards; gate)	—
—	Number	—
—	Size/Length	—
	Invert Material	vegetated
	Anticipated Length of operating service	> 4.5 hrs
169' concrete conduit	Chute Length	—
8.'	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	.02 ft/ft slope

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: —

Records:

Date - —

Max. Reading - —

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

12 INCH RESERVOIR DRAIN

DRAINAGE AREA: 1.34 mi.²

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Residential

Terrain - Relief: moderate

Surface - Soil: low permeability, hills

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface) conditions)

No

Potential Sedimentation problem areas (natural or man-made; present or future)

potential sedimentation problem in culvert passing under Taft Ave.

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

some buildings close to design high water el.

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: None

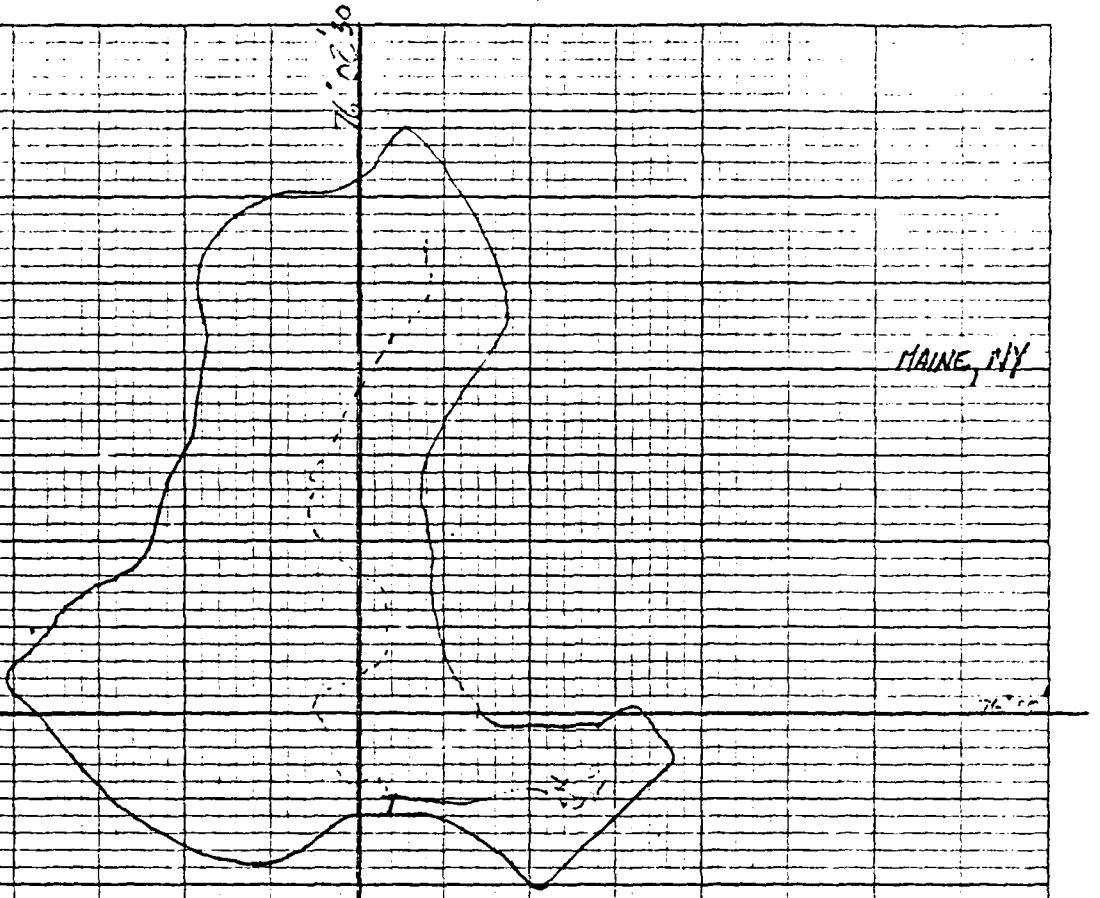
Elevation: —

Reservoir:

Length @ Maximum Pool 1200 (Miles)

Length of Shoreline (@ Spillway Crest) 800 (Miles)

(rounded pond shape)



PATTERSON BRAXIUS SITE 2

D.A. = 860 AC.

$L = (4.6'') \frac{2000}{12(5280)} = 1.74$ MI

$L_{ca} = 1.85'' = .70$ MI.

$C_t = 2.10$ ENDICOTT, NY

$t_p = C_t (L \times L_{ca})^{.3} = 2.1 (1.74 \times .7)^{0.3} = 2.23$ hr

$t_r = t_p / 5.5 = .41$ hr.

$T_p = t_p + .5\, t_r = 2.43$ hr.

PATTERSON BRIXIOS SITE 2

D.A. = 1.34 mi^2

L = 1.74 mi. C_t (ASSUMED) = 2.10

L_{ca} = 0.70 mi.

$t_p = C_t(L \times L_{ca})^{0.3} = 2.23$ hr.

$t_r = t_p / 5.5 = 0.41$ hr.

$T_p = t_p + 0.5 t_r = 2.43$ hr.

$C_p = 0.625$

	ELEV.	STORAGE (AC FT.)	SPILL. CAPACITY. (CFS)
	911.6	0.	-
CONSTRUCT	922.3	~~188~~ ~~11~~ 11.	0
- E.S.	936.8	~~242~~ 188.	109
D.H.W.	938.6	242.	2065
T.O.D.	941.6	357.	9682

L_{DAM} = 700' C = 2.8

```
**********                                                    **********
FLOOD HYDROGRAPH PACKAGE (HEC-1)                              NEW YORK STATE
U.S. ARMY CORPS OF ENGINEERS        JULY 1978                 DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  26 FEB 79                                FLOOD PROTECTION BUREAU
  MODIFIED FOR HEC-1 PC 79
**********                                                    **********
```

1	A1	PATTERSON BRIXIUS SITE 2									
2	A2	PHASE I									
3	A3	PMF									
4	B	200	0	15	0	0	0	0	0	0	0
5	B1	5									
6	J	1	6	1							
7	J1	.2	.4	.5	.6	.8	1				
8	K	0	1			2		1			
9	K1	INFLOW FROM BASIN									
10	A	1	1	1,34							
11	P		21,0	111	123	133	142				
12	T							1	,1		
13	M	2,43	,625								
14	X	-2,0	-,05	1							
15	K	1	1			2		1			
16	K1	ROUTE THROUGH RESERVOIR									
17	Y				1	1					
18	Y1	1						-922,3	-1		
19	Y4	922,3	936,8	938,6	941,6						
20	Y5		109	2065	9682						
21	SS		11	188	242	357					
22	SE	911,6	922,3	936,8	938,6	941,6					
23	SS	922,3									
24	SD	941,6	2,8	1,5	733						
25	K	99									
26	A										
27	A										
28	A										
29	A										
30	A										

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	1
END OF NETWORK	

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
[illegible] SAFETY VERSION JULY 1973
LAST MODIFICATION 26 FEB 79
MODIFIED FOR MCDONNELL JAN 79
****

****
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
****

RUN DATE 03/11/80

PATTERSON BRIXIUS SITE 2
PHASE I
PMF

JOB SPECIFICATION

NC	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
200	0	15	0	0	0	0	0	0	0

JOPER	NMIT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM BASIN

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	2	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	PRATIO	ISAME	LOCAL
1	1	1.34	0.	1.34	0.	0.	0	0

PRECIP DATA

SPFE	PMS	P6	R12	R24	R48	R72	R96
0.	21.00	111.00	123.00	133.00	142.00	0.	0.

TRSPC COMPUTED BY THE PROGRAM IS 0.900

LOSS DATA

LSOPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.	0.	1.00	0.	0.	1.00	1.00	0.10	0.	0.

UNIT HYDROGRAPH DATA
TP= 2.43 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.05 RTIOR= 1.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=10.82 AND R= 9.13 INTERVALS

UNIT HYDROGRAPH 55 END-OF-PERIOD ORDINATES, LAG= 2.41 HOURS, CP= 0.62 VOL= 1.00

7.	27.	54.	85.	113.	134.	144.	207.	221.	227.
220.	203.	182.	163.	145.	131.	117.	105.	94.	84.
78.	68.	61.	54.	49.	44.	39.	35.	31.	28.
25.	23.	20.	18.	16.	15.	13.	12.	11.	9.
8.	8.	7.	6.	5.	5.	4.	4.	4.	3.
3.	3.	2.	2.	2.					

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.15	1	0.00	0.	0.00	3.	1.02	1.15	101	0.03	0.00	0.03	7.

1.01	1.00	4	0.00	0.	0.00	3.	1.02	2.00	104	0.03	0.00	0.03	7.
1.01	1.15	5	0.00	0.	0.00	3.	1.02	2.15	105	0.03	0.00	0.03	8.
1.01	1.30	6	0.00	0.	0.00	3.	1.02	2.30	106	0.03	0.00	0.03	8.
1.01	1.45	7	0.00	0.	0.00	3.	1.02	2.45	107	0.03	0.00	0.03	9.
1.01	2.00	8	0.00	0.	0.00	3.	1.02	3.00	108	0.03	0.00	0.03	9.
1.01	2.15	9	0.00	0.	0.00	3.	1.02	3.15	109	0.03	0.00	0.03	10.
1.01	2.30	10	0.00	0.	0.00	3.	1.02	3.30	110	0.03	0.00	0.03	10.
1.01	2.45	11	0.00	0.	0.00	3.	1.02	3.45	111	0.03	0.00	0.03	10.
1.01	3.00	12	0.00	0.	0.00	3.	1.02	4.00	112	0.03	0.00	0.03	11.
1.01	3.15	13	0.00	0.	0.00	3.	1.02	4.15	113	0.03	0.00	0.03	11.
1.01	3.30	14	0.00	0.	0.00	3.	1.02	4.30	114	0.03	0.00	0.03	11.
1.01	3.45	15	0.00	0.	0.00	3.	1.02	4.45	115	0.03	0.00	0.03	11.
1.01	4.00	16	0.00	0.	0.00	3.	1.02	5.00	116	0.03	0.00	0.03	11.
1.01	4.15	17	0.00	0.	0.00	3.	1.02	5.15	117	0.03	0.00	0.03	12.
1.01	4.30	18	0.00	0.	0.00	3.	1.02	5.30	118	0.03	0.00	0.03	12.
1.01	4.45	19	0.00	0.	0.00	3.	1.02	5.45	119	0.03	0.00	0.03	12.
1.01	5.00	20	0.00	0.	0.00	3.	1.02	6.00	120	0.03	0.00	0.03	12.
1.01	5.15	21	0.00	0.	0.00	3.	1.02	6.15	121	0.08	0.06	0.03	12.
1.01	5.30	22	0.00	0.	0.00	3.	1.02	6.30	122	0.08	0.06	0.03	14.
1.01	5.45	23	0.00	0.	0.00	3.	1.02	6.45	123	0.08	0.06	0.03	17.
1.01	6.00	24	0.00	0.	0.00	3.	1.02	7.00	124	0.08	0.06	0.03	22.
1.01	6.15	25	0.01	0.	0.01	3.	1.02	7.15	125	0.08	0.06	0.03	29.
1.01	6.30	26	0.01	0.	0.01	3.	1.02	7.30	126	0.08	0.06	0.03	37.
1.01	6.45	27	0.01	0.	0.01	3.	1.02	7.45	127	0.08	0.06	0.03	46.
1.01	7.00	28	0.01	0.	0.01	3.	1.02	8.00	128	0.08	0.06	0.03	59.
1.01	7.15	29	0.01	0.	0.01	3.	1.02	8.15	129	0.08	0.06	0.03	72.
1.01	7.30	30	0.01	0.	0.01	3.	1.02	8.30	130	0.08	0.06	0.03	84.
1.01	7.45	31	0.01	0.	0.01	3.	1.02	8.45	131	0.08	0.06	0.03	97.
1.01	8.00	32	0.01	0.	0.01	3.	1.02	9.00	132	0.08	0.06	0.03	108.
1.01	8.15	33	0.01	0.	0.01	3.	1.02	9.15	133	0.08	0.06	0.03	118.
1.01	8.30	34	0.01	0.	0.01	3.	1.02	9.30	134	0.08	0.06	0.03	128.
1.01	8.45	35	0.01	0.	0.01	3.	1.02	9.45	135	0.08	0.06	0.03	136.
1.01	9.00	36	0.01	0.	0.01	3.	1.02	10.00	136	0.08	0.06	0.03	143.
1.01	9.15	37	0.01	0.	0.01	3.	1.02	10.15	137	0.08	0.06	0.03	150.
1.01	9.30	38	0.01	0.	0.01	3.	1.02	10.30	138	0.08	0.06	0.03	156.
1.01	9.45	39	0.01	0.	0.01	3.	1.02	10.45	139	0.08	0.06	0.03	161.
1.01	10.00	40	0.01	0.	0.01	3.	1.02	11.00	140	0.08	0.06	0.03	166.
1.01	10.15	41	0.01	0.	0.01	3.	1.02	11.15	141	0.08	0.06	0.03	170.
1.01	10.30	42	0.01	0.	0.01	3.	1.02	11.30	142	0.08	0.06	0.03	174.
1.01	10.45	43	0.01	0.	0.01	3.	1.02	11.45	143	0.08	0.06	0.03	177.
1.01	11.00	44	0.01	0.	0.01	3.	1.02	12.00	144	0.08	0.06	0.03	180.
1.01	11.15	45	0.01	0.	0.01	3.	1.02	12.15	145	0.47	0.44	0.02	186.
1.01	11.30	46	0.01	0.	0.01	3.	1.02	12.30	146	0.47	0.44	0.02	198.
1.01	11.45	47	0.01	0.	0.01	3.	1.02	12.45	147	0.47	0.44	0.02	221.
1.01	12.00	48	0.01	0.	0.01	3.	1.02	13.00	148	0.47	0.44	0.02	256.
1.01	12.15	49	0.03	0.	0.03	3.	1.02	13.15	149	0.56	0.53	0.02	303.
1.01	12.30	50	0.03	0.	0.03	3.	1.02	13.30	150	0.56	0.53	0.02	366.
1.01	12.45	51	0.03	0.	0.03	3.	1.02	13.45	151	0.56	0.53	0.02	443.
1.01	13.00	52	0.03	0.	0.03	3.	1.02	14.00	152	0.56	0.53	0.02	531.
1.01	13.15	53	0.04	0.	0.04	3.	1.02	14.15	153	0.70	0.67	0.02	629.
1.01	13.30	54	0.04	0.	0.04	3.	1.02	14.30	154	0.70	0.67	0.02	735.
1.01	13.45	55	0.04	0.	0.04	3.	1.02	14.45	155	0.70	0.67	0.02	845.
1.01	14.00	56	0.04	0.	0.04	3.	1.02	15.00	156	0.70	0.67	0.02	954.
1.01	14.15	57	0.05	0.	0.05	3.	1.02	15.15	157	0.71	0.68	0.02	1062.
1.01	14.30	58	0.05	0.	0.05	3.	1.02	15.30	158	1.42	1.39	0.03	1172.
1.01	14.45	59	0.05	0.	0.05	3.	1.02	15.45	159	3.97	3.94	0.03	1313.
1.01	15.00	60	0.05	0.	0.05	3.	1.02	16.00	160	0.99	0.97	0.02	1496.
1.01	15.15	61	0.05	0.	0.05	3.	1.02	16.15	161	0.65	0.63	0.02	1707.
1.01	15.30	62	0.10	0.	0.10	3.	1.02	16.30	162	0.65	0.63	0.02	1928.
1.01	15.45	63	0.27	0.06	0.21	3.	1.02	16.45	163	0.65	0.63	0.02	2151.
1.01	16.00	64	0.07	0.04	0.03	4.	1.02	17.00	164	0.65	0.63	0.02	2366.
1.01	16.15	65	0.04	0.02	0.03	7.	1.02	17.15	165	0.51	0.49	0.02	2551.
1.01	16.30	66	0.04	0.02	0.03	10.	1.02	17.30	166	0.51	0.49	0.02	2692.
1.01	16.45	67	0.04	0.02	0.03	15.	1.02	17.45	167	0.51	0.49	0.02	2780.

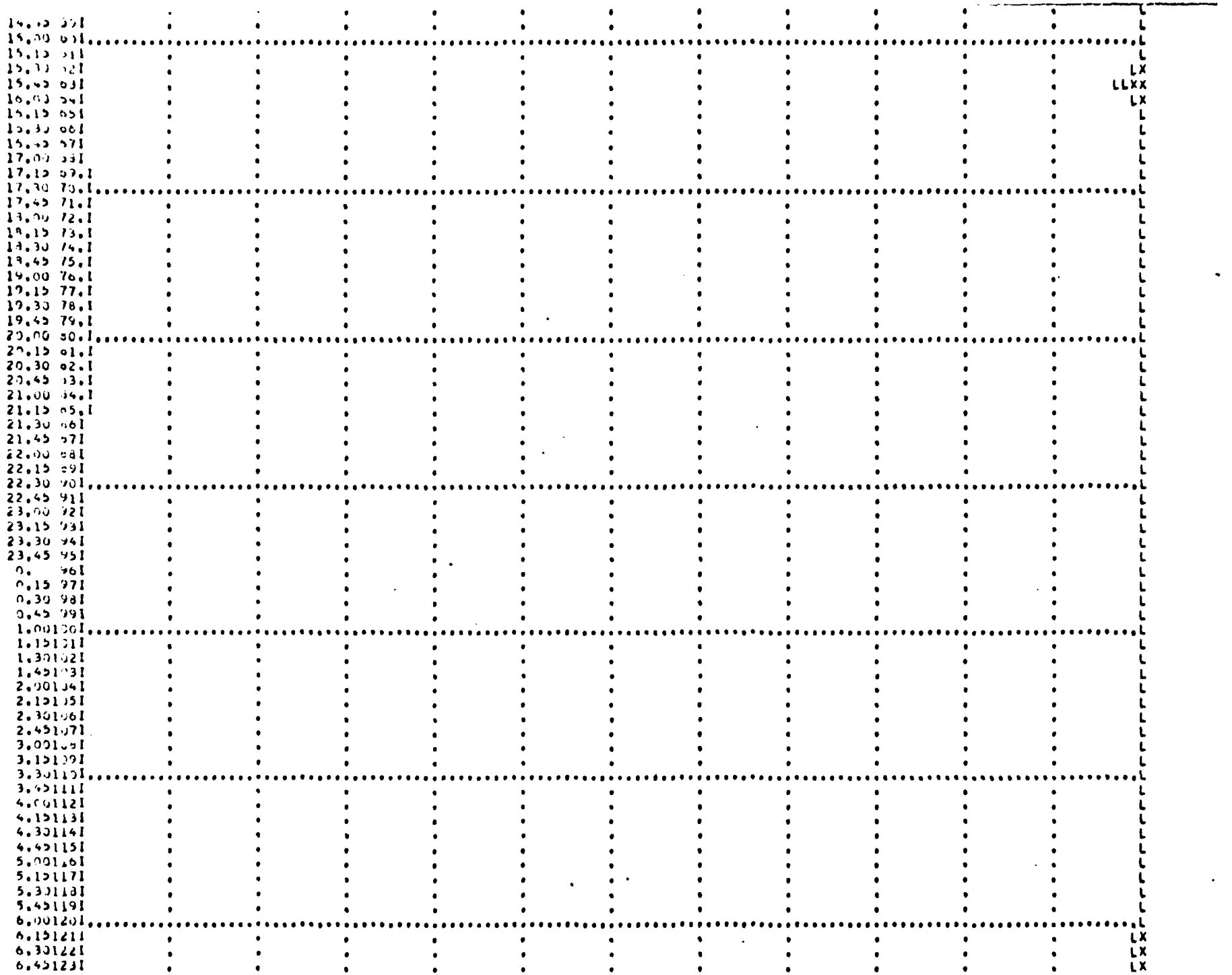
1.01	17.15	69	0.01	0.01	0.03	35.	1.02	19.15	169	0.04	0.02	0.03	2410.
1.01	17.30	70	0.01	0.01	0.03	34.	1.02	19.30	170	0.04	0.02	0.03	2229.
1.01	17.45	71	0.01	0.01	0.03	33.	1.02	19.45	171	0.04	0.02	0.03	2614.
1.01	18.00	72	0.01	0.01	0.03	32.	1.02	19.00	172	0.04	0.02	0.03	2485.
1.01	18.15	73	0.00	0.	0.00	42.	1.02	19.15	173	0.04	0.02	0.03	2345.
1.01	18.30	74	0.00	0.	0.00	43.	1.02	19.30	174	0.04	0.02	0.03	2194.
1.01	18.45	75	0.00	0.	0.00	43.	1.02	19.45	175	0.04	0.02	0.03	2034.
1.01	19.00	76	0.00	0.	0.00	43.	1.02	20.00	176	0.04	0.02	0.03	1870.
1.01	19.15	77	0.00	0.	0.00	41.	1.02	20.15	177	0.04	0.02	0.03	1706.
1.01	19.30	78	0.00	0.	0.00	39.	1.02	20.30	178	0.04	0.02	0.03	1546.
1.01	19.45	79	0.00	0.	0.00	36.	1.02	20.45	179	0.04	0.02	0.03	1394.
1.01	20.00	80	0.00	0.	0.00	34.	1.02	21.00	180	0.04	0.02	0.03	1255.
1.01	20.15	81	0.00	0.	0.00	31.	1.02	21.15	181	0.04	0.02	0.03	1131.
1.01	20.30	82	0.00	0.	0.00	28.	1.02	21.30	182	0.04	0.02	0.03	1020.
1.01	20.45	83	0.00	0.	0.00	26.	1.02	21.45	183	0.04	0.02	0.03	920.
1.01	21.00	84	0.00	0.	0.00	23.	1.02	22.00	184	0.04	0.02	0.03	831.
1.01	21.15	85	0.00	0.	0.00	21.	1.02	22.15	185	0.04	0.02	0.03	751.
1.01	21.30	86	0.00	0.	0.00	19.	1.02	22.30	186	0.04	0.02	0.03	679.
1.01	21.45	87	0.00	0.	0.00	18.	1.02	22.45	187	0.04	0.02	0.03	615.
1.01	22.00	88	0.00	0.	0.00	16.	1.02	23.00	188	0.04	0.02	0.03	557.
1.01	22.15	89	0.00	0.	0.00	15.	1.02	23.15	189	0.04	0.02	0.03	506.
1.01	22.30	90	0.00	0.	0.00	13.	1.02	23.30	190	0.04	0.02	0.03	460.
1.01	22.45	91	0.00	0.	0.00	12.	1.02	23.45	191	0.04	0.02	0.03	418.
1.01	23.00	92	0.00	0.	0.00	11.	1.03	0.	192	0.04	0.02	0.03	381.
1.01	23.15	93	0.00	0.	0.00	10.	1.03	0.15	193	0.	0.	0.	348.
1.01	23.30	94	0.00	0.	0.00	10.	1.03	0.30	194	0.	0.	0.	317.
1.01	23.45	95	0.00	0.	0.00	9.	1.03	0.45	195	0.	0.	0.	290.
1.02	0.	96	0.00	0.	0.00	8.	1.03	1.00	196	0.	0.	0.	264.
1.02	0.15	97	0.03	0.00	0.03	8.	1.03	1.15	197	0.	0.	0.	241.
1.02	0.30	98	0.03	0.00	0.03	7.	1.03	1.30	198	0.	0.	0.	219.
1.02	0.45	99	0.03	0.00	0.03	7.	1.03	1.45	199	0.	0.	0.	199.
1.02	1.00	100	0.03	0.00	0.03	7.	1.03	2.00	200	0.	0.	0.	179.
									SUM	23.86	20.16	3.70	68675.
										(606.)	(512.)	(94.)	(1944.66)

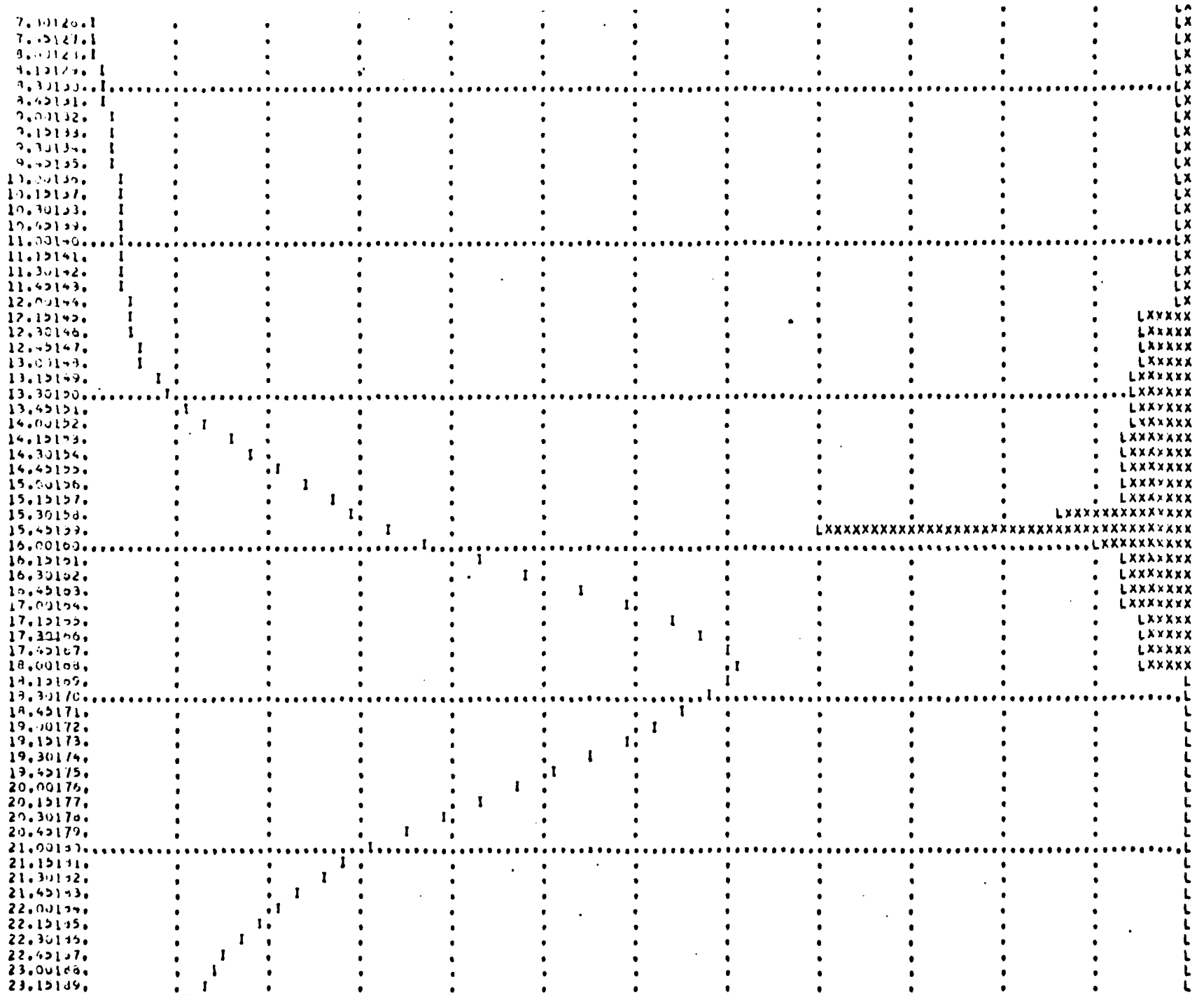
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2829.	2045.	704.	343.	68565.
CMS	80.	58.	20.	10.	1942.
INCHES		14.19	19.54	19.83	19.83
MM		360.50	496.41	503.74	503.74
AC-FT		1014.	1396.	1417.	1417.
THOUS CU M		1251.	1722.	1747.	1747.

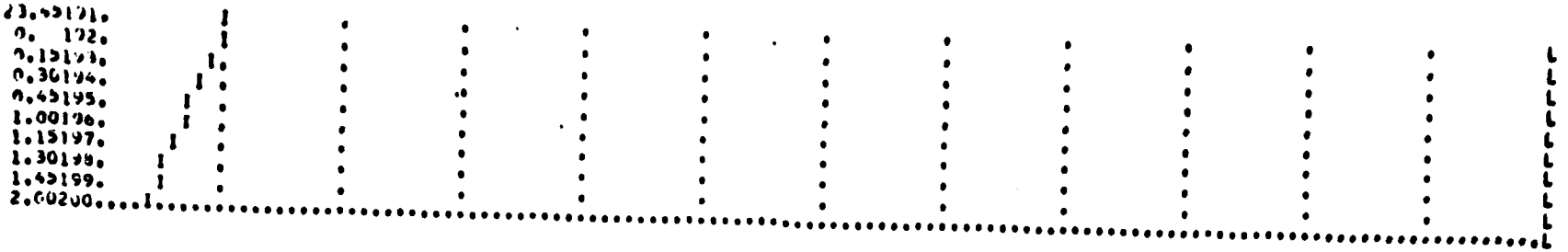
STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

	0.	400.	800.	1200.	1600.	2000.	2400.	2800.	3200.	0.	0. PRECIP(L) AND EXCESS(X)	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	4.	3.	2.	1.	0.
0.15	1I												L
0.30	2I												L
0.45	3I												L
1.00	4I												L
1.15	5I												L
1.30	6I												L
1.45	7I												L
2.00	8I												L
2.15	9I												L
2.30	10I												L
2.45	11I												L
3.00	12I												L
3.15	13I												L
3.30	14I												L
3.45	15I												L
4.00	16I												L
4.15	17I												L
4.30	18I												L
4.45	19I												L
5.00	20I												L
5.15	21I												L
5.30	22I												L
5.45	23I												L
6.00	24I												L
6.15	25I												L
6.30	26I												L
6.45	27I												L
7.00	28I												L
7.15	29I												L
7.30	30I												L
7.45	31I												L
8.00	32I												L
8.15	33I												L
8.30	34I												L
8.45	35I												L
9.00	36I												L
9.15	37I												L
9.30	38I												L
9.45	39I												L
10.00	40I												L
10.15	41I												L
10.30	42I												L
10.45	43I												L
11.00	44I												L
11.15	45I												L
11.30	46I												L
11.45	47I												L
12.00	48I												L
12.15	49I												L
12.30	50I												L
12.45	51I												L
13.00	52I												L
13.15	53I												L
13.30	54I												L
13.45	55I												L
14.00	56I												L
14.15	57I												L






23.45171.
0. 172.
0.15173.
0.30174.
0.45195.
1.00196.
1.15197.
1.30198.
1.45199.
2.00200.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIC 1

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	3.	4.	5.	6.
7.	8.	8.	9.	9.	9.	8.	8.	7.	7.
6.	6.	5.	5.	4.	4.	4.	3.	3.	3.
2.	2.	2.	2.	2.	2.	2.	1.	1.	1.
1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	3.	3.	4.	6.	7.	10.	12.	14.	17.
19.	22.	24.	26.	27.	29.	30.	31.	32.	33.
34.	35.	35.	36.	37.	40.	44.	51.	61.	73.
89.	106.	126.	147.	169.	191.	212.	234.	263.	295.
341.	386.	430.	473.	513.	538.	557.	566.	562.	546.
523.	497.	469.	439.	407.	374.	341.	307.	279.	251.
226.	204.	184.	166.	150.	136.	123.	111.	101.	92.
84.	76.	70.	63.	58.	53.	48.	44.	40.	36.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	566.	409.	141.	69.	13713.
CMS	16.	12.	4.	2.	388.
INCHES		2.84	3.91	3.97	3.97
MM		72.10	99.28	100.75	100.75
AC-FT		203.	279.	283.	283.
THOUS CU M		250.	344.	349.	349.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIC 2

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	3.	4.	6.	8.	10.	12.
14.	16.	17.	17.	17.	17.	16.	16.	15.	14.
12.	11.	10.	9.	9.	8.	7.	6.	6.	5.
5.	5.	4.	4.	4.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	4.	4.	4.	4.
4.	4.	4.	4.	5.	5.	5.	5.	5.	5.
5.	6.	7.	9.	11.	15.	19.	24.	29.	34.
39.	43.	47.	51.	54.	57.	60.	62.	64.	66.
68.	70.	71.	72.	74.	79.	88.	102.	121.	147.
177.	213.	252.	294.	335.	382.	425.	469.	525.	595.
683.	771.	860.	946.	1020.	1077.	1114.	1132.	1124.	1091.
1045.	994.	938.	878.	813.	748.	682.	618.	558.	502.
453.	408.	368.	332.	300.	272.	246.	223.	202.	184.
167.	152.	139.	127.	116.	106.	96.	88.	79.	72.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1132.	818.	282.	137.	27426.
CMS	32.	23.	8.	4.	777.
INCHES		5.68	7.82	7.93	7.93
MM		144.20	198.56	201.50	201.50
AC-FT		406.	558.	567.	567.
THOUS CU M		500.	689.	699.	699.

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	3.	5.	7.	10.	12.	15.
17.	19.	21.	22.	22.	21.	21.	19.	18.	17.
15.	14.	13.	12.	11.	10.	9.	8.	7.	7.
6.	6.	5.	5.	4.	4.	4.	4.	3.	3.
3.	3.	4.	4.	4.	4.	4.	5.	5.	5.
5.	5.	5.	6.	6.	6.	6.	6.	6.	6.
6.	7.	9.	11.	14.	19.	24.	30.	36.	42.
48.	54.	59.	64.	68.	72.	75.	78.	80.	83.
85.	87.	89.	95.	98.	99.	111.	129.	152.	183.
222.	266.	314.	367.	422.	477.	531.	580.	656.	748.
853.	964.	1070.	1163.	1275.	1340.	1392.	1415.	1405.	1364.
1307.	1243.	1173.	1097.	1017.	935.	853.	773.	697.	628.
566.	510.	460.	416.	375.	340.	308.	279.	253.	230.
209.	191.	174.	159.	145.	132.	120.	109.	99.	89.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1415.	1022.	352.	171.	34282.
CMS	40.	29.	10.	5.	971.
INCHES		7.10	9.77	9.92	9.92
MM		180.25	248.21	251.87	251.87
AC-FT		507.	698.	706.	706.
THOUS CU M		625.	861.	874.	874.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIC 4

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	4.	6.	9.	12.	15.	18.
21.	23.	25.	26.	26.	26.	25.	23.	22.	20.
19.	17.	15.	14.	13.	12.	11.	10.	9.	8.
7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
4.	4.	4.	4.	5.	5.	5.	6.	6.	6.
6.	6.	7.	7.	7.	7.	7.	7.	7.	7.
7.	8.	10.	13.	17.	22.	29.	38.	43.	51.
58.	65.	71.	77.	82.	86.	90.	93.	97.	99.
102.	104.	106.	108.	111.	119.	133.	153.	182.	220.
266.	319.	377.	441.	507.	572.	637.	703.	768.	858.
1024.	1157.	1291.	1419.	1531.	1615.	1671.	1697.	1686.	1637.
1561.	1491.	1407.	1316.	1220.	1122.	1024.	927.	836.	753.
679.	612.	552.	499.	451.	408.	369.	334.	304.	276.
251.	229.	209.	190.	174.	159.	144.	131.	119.	107.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1697.	1227.	422.	206.	41139.
CMS	48.	35.	12.	6.	1165.
INCHES		8.52	11.73	11.90	11.90
MM		216.30	297.85	302.25	302.25
AC-FT		608.	838.	850.	850.
THOUS CU M		750.	1033.	1048.	1048.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIC 5

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	4.	6.	8.	12.	16.	20.	24.
27.	31.	34.	35.	33.	30.	33.	31.	29.	27.
25.	23.	21.	19.	17.	15.	14.	13.	12.	11.
10.	9.	8.	8.	7.	7.	6.	6.	6.	5.
5.	5.	6.	6.	6.	7.	7.	7.	8.	8.
8.	8.	9.	9.	9.	9.	9.	9.	9.	10.
10.	11.	14.	17.	23.	36.	55.	47.	57.	68.
77.	87.	95.	102.	109.	115.	120.	125.	129.	133.
136.	139.	142.	144.	147.	150.	177.	206.	243.	268.
554.	625.	703.	788.	879.	953.	845.	923.	1050.	1167.
1305.	1542.	1721.	1893.	2041.	2154.	2225.	2283.	2248.	2183.
2091.	1908.	1876.	1755.	1627.	1496.	1365.	1237.	1115.	1004.
905.	816.	730.	665.	601.	543.	492.	446.	405.	368.
335.	305.	278.	254.	232.	211.	193.	175.	159.	143.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2263.	1030.	563.	274.	54052.
CMS	64.	46.	16.	8.	1553.
INCHES		11.35	15.63	15.87	15.97
MM		288.40	397.13	402.99	402.99
AC-FT		811.	1117.	1133.	1133.
THOUS CU M		1000.	1378.	1396.	1396.

HYDROGRAPH AT STA 1 FOR PLAN 1, PTIC 6

3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	4.	7.	10.	15.	20.	25.	30.
35.	39.	42.	43.	43.	43.	41.	39.	36.	34.
31.	29.	26.	23.	21.	19.	18.	16.	15.	13.
12.	11.	10.	10.	9.	8.	8.	7.	7.	7.
7.	7.	7.	7.	7.	8.	9.	9.	10.	10.
10.	11.	11.	11.	11.	11.	12.	12.	12.	12.
12.	14.	17.	22.	29.	37.	48.	59.	72.	84.
97.	108.	118.	128.	136.	143.	150.	156.	161.	166.
170.	174.	177.	180.	185.	198.	221.	256.	303.	366.
443.	531.	629.	735.	845.	954.	1062.	1172.	1313.	1496.
1707.	1928.	2151.	2366.	2551.	2692.	2786.	2829.	2810.	2725.
2614.	2485.	2345.	2194.	2034.	1870.	1706.	1546.	1394.	1255.
1131.	1020.	920.	831.	751.	679.	615.	557.	506.	460.
419.	381.	348.	317.	291.	264.	241.	219.	199.	179.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2829.	2045.	704.	343.	68565.
CMS	80.	58.	20.	10.	1942.
INCHES		14.19	19.54	19.83	19.83
MM		360.50	496.41	503.74	503.74
AC-FT		1014.	1396.	1417.	1417.
THOUS CU M		1251.	1722.	1747.	1747.

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HYDROGRAPH ROUTING

ROUTE THROUGH RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	2.	3.	3.	3.	3.	3.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	5.
5.	5.	5.	5.	5.	5.	5.	6.	6.	6.
7.	7.	8.	9.	9.	10.	11.	12.	12.	13.
14.	15.	16.	17.	18.	19.	20.	21.	23.	25.
27.	30.	33.	37.	41.	46.	52.	59.	66.	74.
83.	93.	105.	501.	897.	1123.	1257.	1337.	1376.	1380.
1357.	1312.	1255.	1190.	1117.	1041.	961.	880.	801.	726.
656.	591.	534.	481.	435.	393.	355.	321.	291.	264.
240.	218.	198.	181.	165.	151.	137.	125.	114.	105.

STORAGE

11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	13.	13.	13.
13.	14.	14.	15.	15.	15.	16.	16.	16.	17.
17.	17.	17.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	19.	19.	19.	19.	20.	20.	21.
22.	23.	24.	25.	26.	27.	29.	30.	31.	33.
34.	36.	37.	39.	40.	42.	44.	46.	48.	51.
55.	59.	64.	71.	78.	86.	96.	106.	116.	131.
146.	163.	182.	199.	213.	216.	220.	222.	223.	223.
222.	221.	220.	218.	215.	214.	212.	209.	207.	205.
203.	201.	200.	198.	197.	196.	195.	194.	193.	192.
192.	191.	190.	190.	189.	189.	189.	188.	188.	188.

STAGE

922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3
922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3
922.3	922.3	922.3	922.3	922.3	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.5
922.5	922.5	922.6	922.6	922.6	922.7	922.7	922.7	922.7	922.8
922.8	922.8	922.8	922.8	922.8	922.9	922.9	922.9	922.9	922.9
922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9
922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9
922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9	922.9
922.9	922.9	922.9	922.9	922.9	923.0	923.0	923.0	923.1	923.1

924.2	924.3	924.4	924.6	924.7	924.8	925.6	925.1	925.3	925.9
925.9	926.2	926.7	927.2	927.6	929.5	929.3	930.1	931.0	932.1
933.3	934.7	936.3	937.2	937.5	937.7	937.9	937.9	938.0	938.0
937.9	937.9	937.9	937.8	937.7	937.7	937.6	937.5	937.4	937.4
937.3	937.2	937.2	937.1	937.1	937.1	937.0	937.0	937.0	936.9
936.9	936.9	936.9	936.9	936.9	936.8	936.8	936.8	936.8	936.8

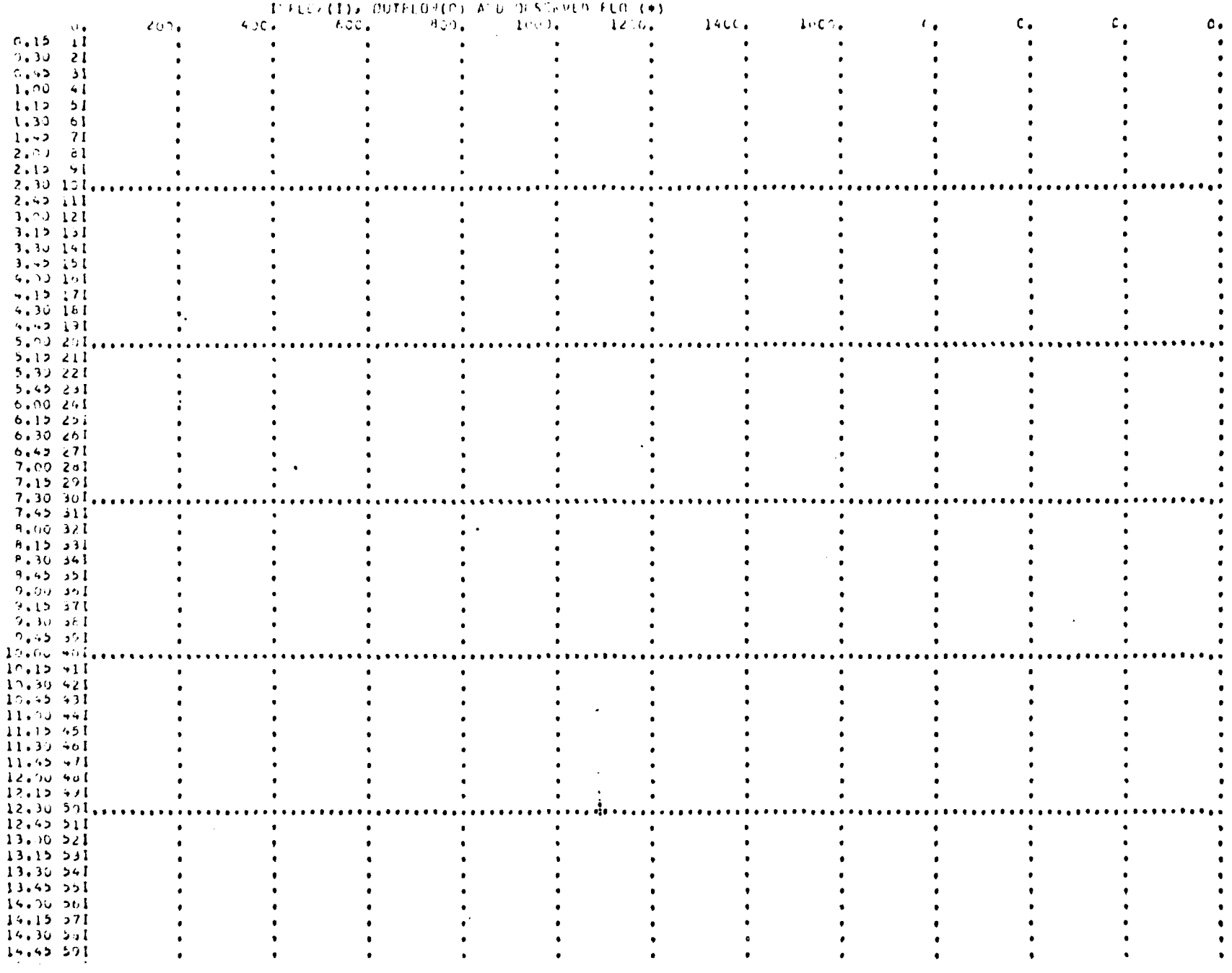
PEAK OUTFLOW IS 1380. AT TIME 42.50 HOURS

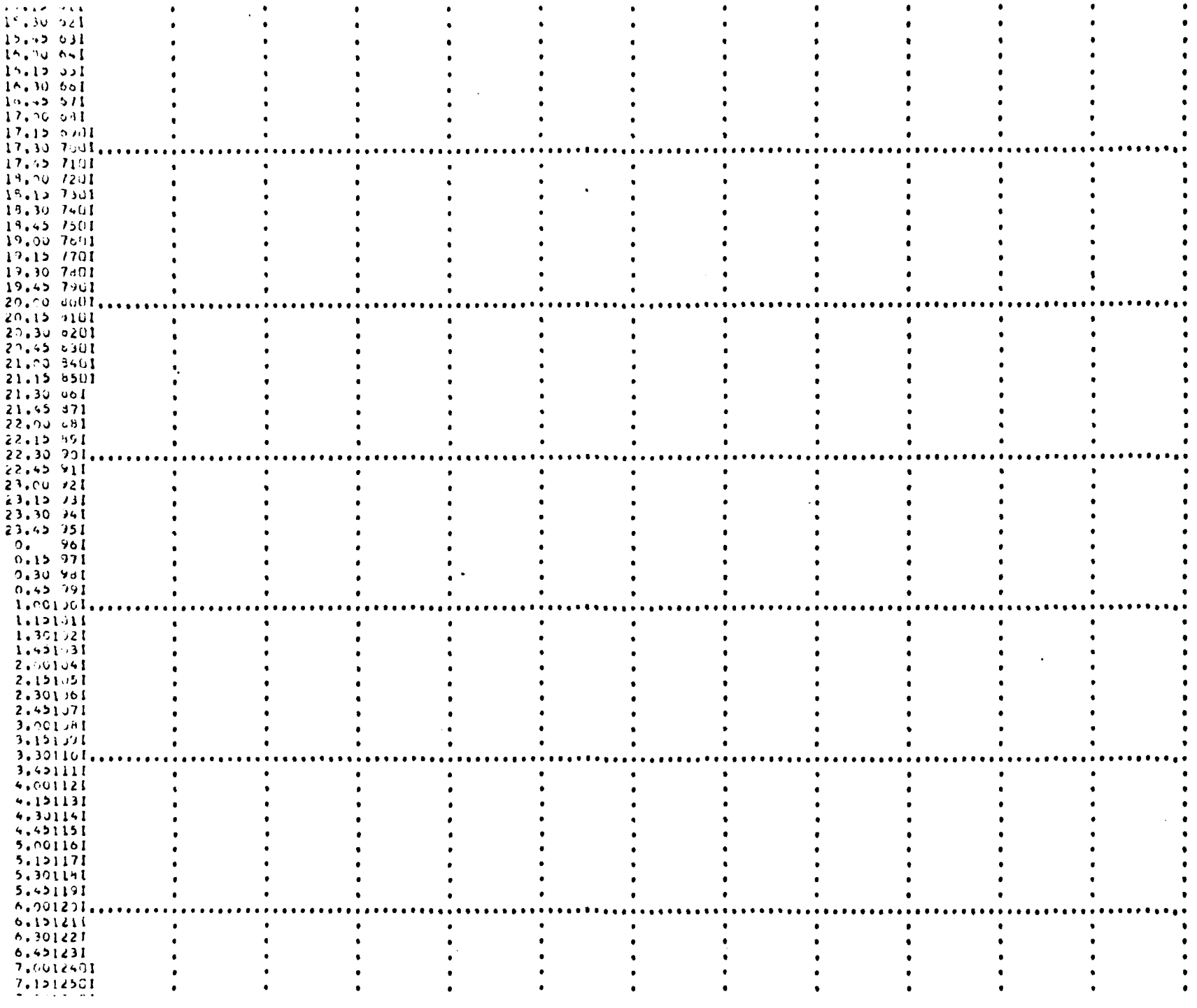
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1380.	911.	266.	129.	25727.
CMS	39.	26.	8.	4.	729.
INCHES		6.32	7.40	7.44	7.44
MM		160.64	187.85	189.02	189.02
AC-FT		452.	528.	532.	532.
THOUS CU M		557.	652.	656.	656.

I,F

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW (*)

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18.45 63I
19.00 64I
19.15 65I
19.30 66I
19.45 67I
20.00 68I
20.15 69I
20.30 70I
20.45 71I
21.00 72I
21.15 73I
21.30 74I
21.45 75I
22.00 76I
22.15 77I
22.30 78I
22.45 79I
23.00 80I
23.15 81I
23.30 82I
23.45 83I
0. 84I
0.15 85I
0.30 86I
0.45 87I
1.00 88I
1.15 89I
1.30 90I
1.45 91I
2.00 92I
2.15 93I
2.30 94I
2.45 95I
3.00 96I
3.15 97I
3.30 98I
3.45 99I
4.00 100I
4.15 101I
4.30 102I
4.45 103I
5.00 104I
5.15 105I
5.30 106I
5.45 107I
6.00 108I
6.15 109I
6.30 110I
6.45 111I
7.00 112I
7.15 113I
7.30 114I
7.45 115I
8.00 116I
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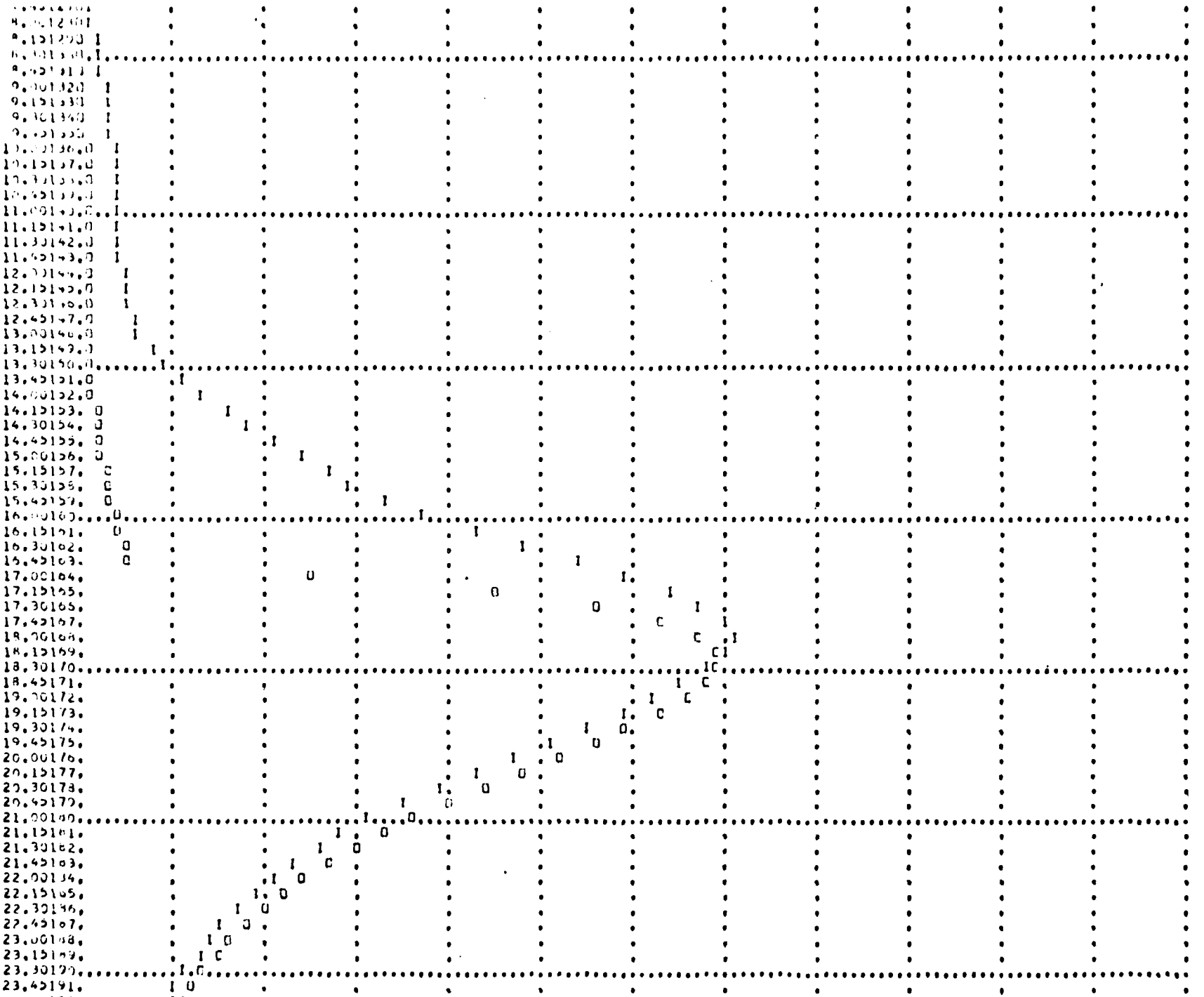
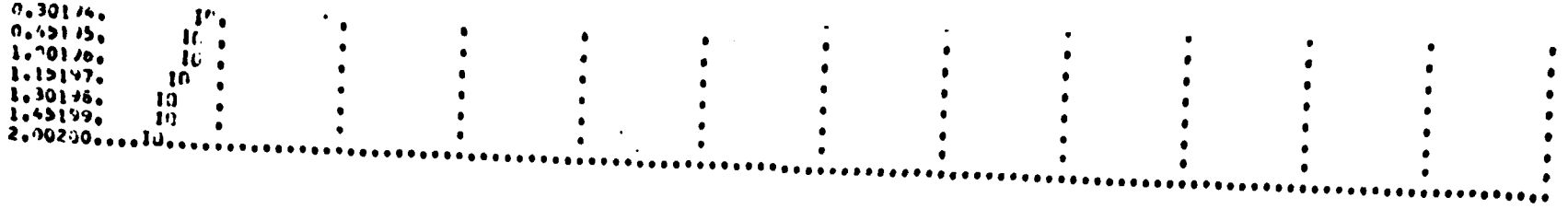
10.15 125I




0.30174.
0.45145.
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1.15197.
1.30148.
1.45199.
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STATION 1, PLAN 1, RATIO 6

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	2.	2.	2.	3.
3.	3.	4.	4.	4.	5.	6.	6.	7.	7.
7.	8.	8.	8.	8.	8.	8.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	10.	10.	10.	11.	11.	12.
13.	14.	16.	17.	19.	20.	22.	24.	25.	27.
29.	30.	32.	34.	36.	38.	40.	43.	46.	49.
54.	59.	66.	74.	83.	93.	104.	466.	989.	1170.
1405.	1629.	1853.	2076.	2387.	2577.	2709.	2789.	2814.	2778.
2691.	2578.	2445.	2303.	2149.	2014.	1891.	1745.	1596.	1448.
1330.	1132.	1067.	983.	869.	755.	710.	643.	582.	528.
479.	436.	397.	362.	331.	301.	275.	250.	228.	206.

STORAGE

11.	11.	11.	11.	11.	11.	11.	11.	11.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	12.	12.	12.	12.	12.	12.	12.
12.	12.	12.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	13.	13.	13.	13.	13.	13.
13.	13.	13.	13.	14.	14.	14.	14.	15.	15.
16.	16.	17.	18.	19.	20.	20.	21.	22.	22.
23.	23.	24.	24.	24.	25.	25.	25.	25.	25.
25.	25.	25.	25.	25.	25.	25.	25.	25.	25.
25.	25.	25.	25.	25.	25.	25.	25.	25.	25.
25.	25.	25.	25.	25.	25.	25.	25.	26.	26.
26.	26.	26.	26.	26.	27.	28.	29.	30.	31.
33.	34.	36.	39.	41.	43.	46.	49.	52.	54.
57.	60.	63.	66.	69.	72.	76.	80.	85.	91.
98.	107.	118.	130.	143.	162.	181.	196.	210.	217.
224.	230.	236.	242.	247.	250.	252.	253.	253.	253.
251.	250.	248.	246.	243.	241.	237.	233.	229.	225.
221.	218.	214.	212.	209.	207.	205.	203.	201.	200.
198.	197.	196.	195.	194.	193.	193.	192.	191.	191.

STAGE

922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3	922.3
922.3	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4	922.4
922.4	922.4	922.5	922.5	922.5	922.5	922.5	922.5	922.5	922.5
922.5	922.5	922.5	922.5	922.5	922.5	922.5	922.5	922.5	922.5
922.5	922.5	922.5	922.5	922.5	922.5	922.5	922.6	922.6	922.6
922.7	922.7	922.8	922.9	922.9	923.0	923.1	923.1	923.2	923.2
923.3	923.3	923.3	923.4	923.4	923.4	923.4	923.4	923.5	923.5
923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5
923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5
923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5	923.5
923.5	923.5	923.5	923.5	923.6	923.6	923.7	923.7	923.8	923.9

920.1	920.3	920.8	926.5	927.1	927.3	927.8	928.0	928.4	928.8
929.4	930.2	931.0	932.1	933.3	934.7	936.2	937.1	937.5	937.8
938.0	938.2	938.4	938.6	938.7	938.8	938.9	938.9	938.9	938.9
938.8	938.8	938.7	938.7	938.6	938.6	938.4	938.3	938.2	938.0
937.9	937.8	937.7	937.6	937.5	937.4	937.4	937.3	937.2	937.2
937.1	937.1	937.1	937.0	937.0	937.0	937.0	936.9	936.9	936.9

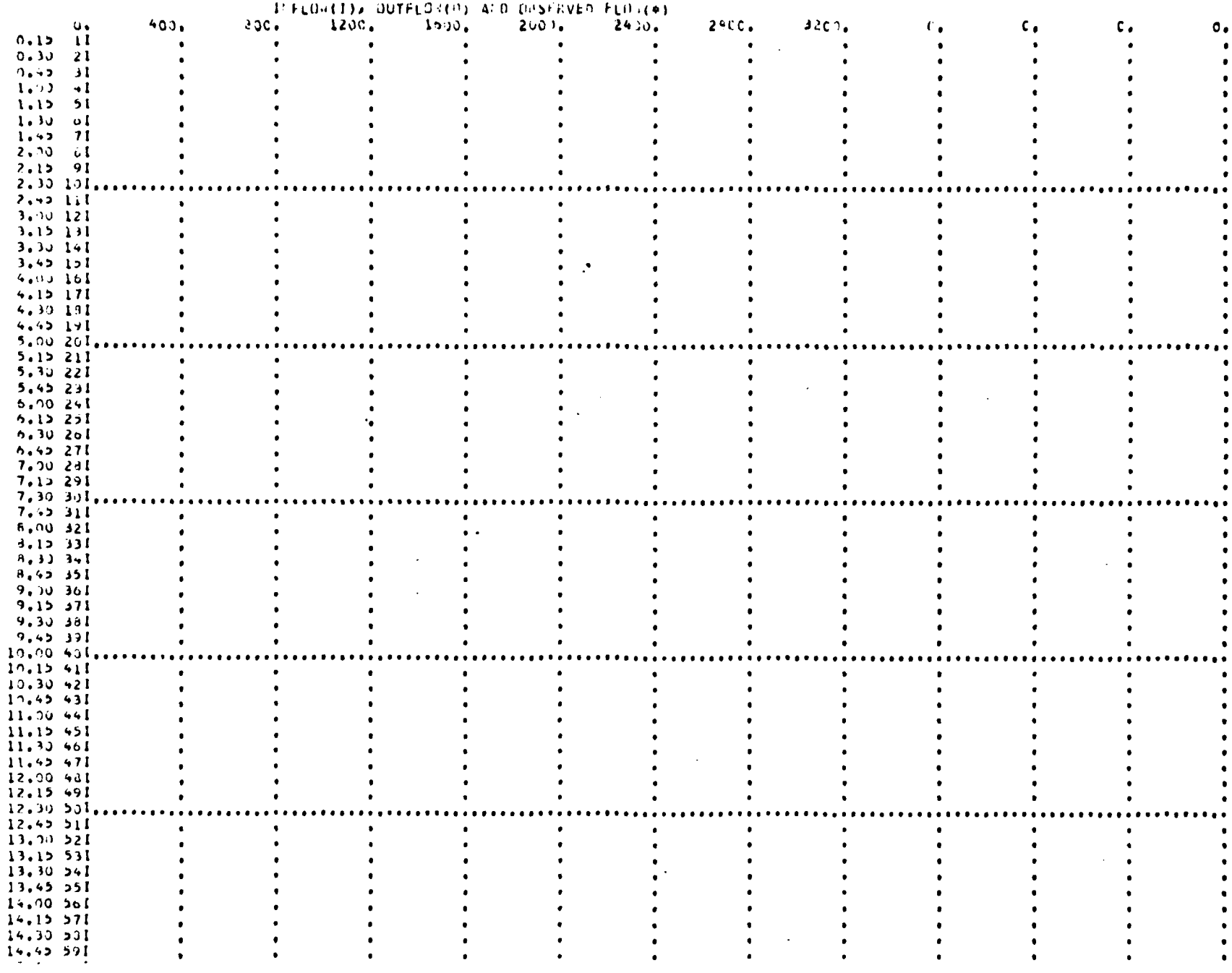
PEAK OUTFLOW IS 2814. AT TIME 42.25 HOURS

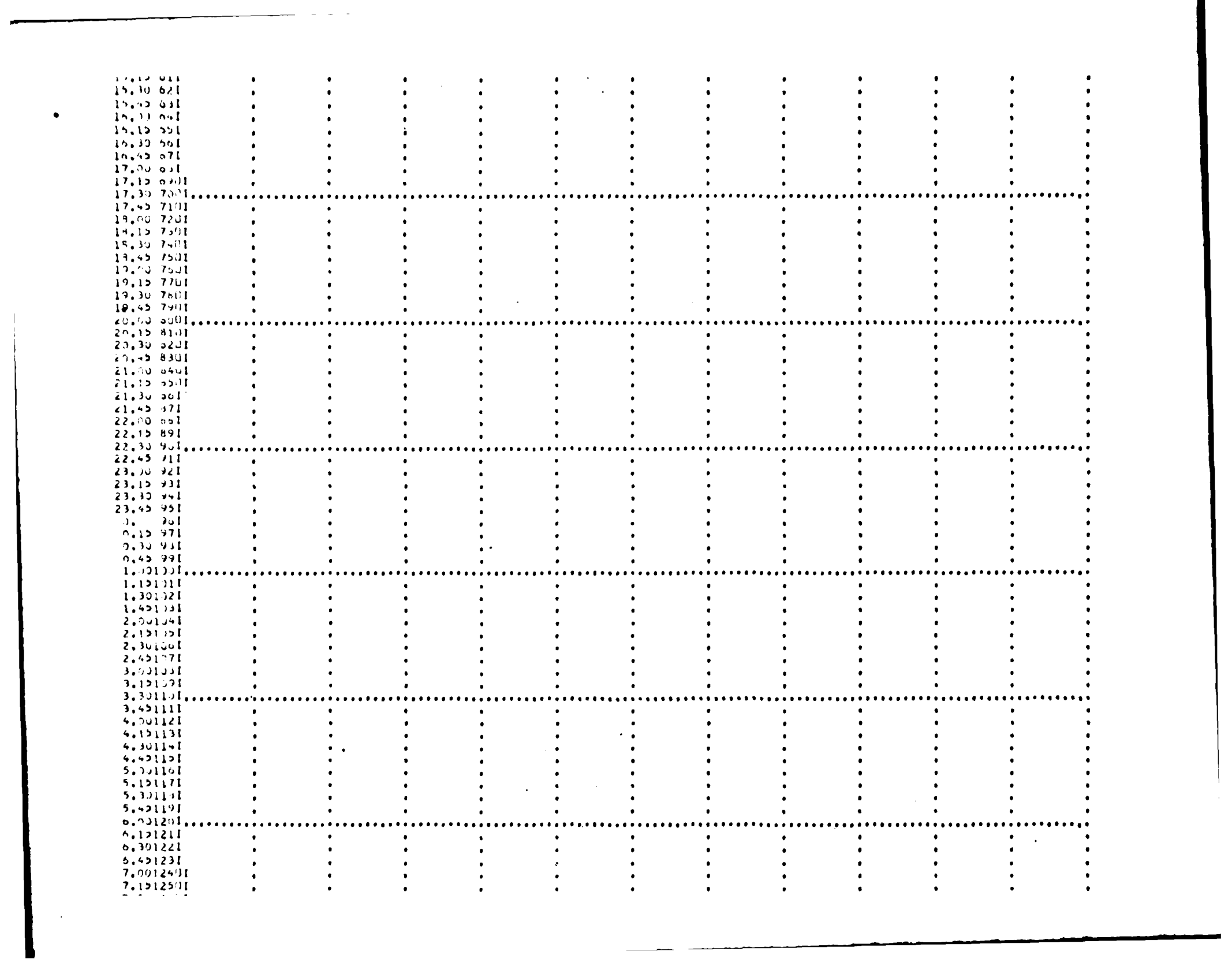
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2814.	2021.	620.	299.	59[illegible].
CMS	80.	57.	18.	8.	1693.
INCHES		14.03	17.23	17.32	17.32
MM		356.44	437.52	439.85	439.85
AC-FT		1002.	1230.	1237.	1237.
THOUS CU M		1236.	1518.	1526.	1526.

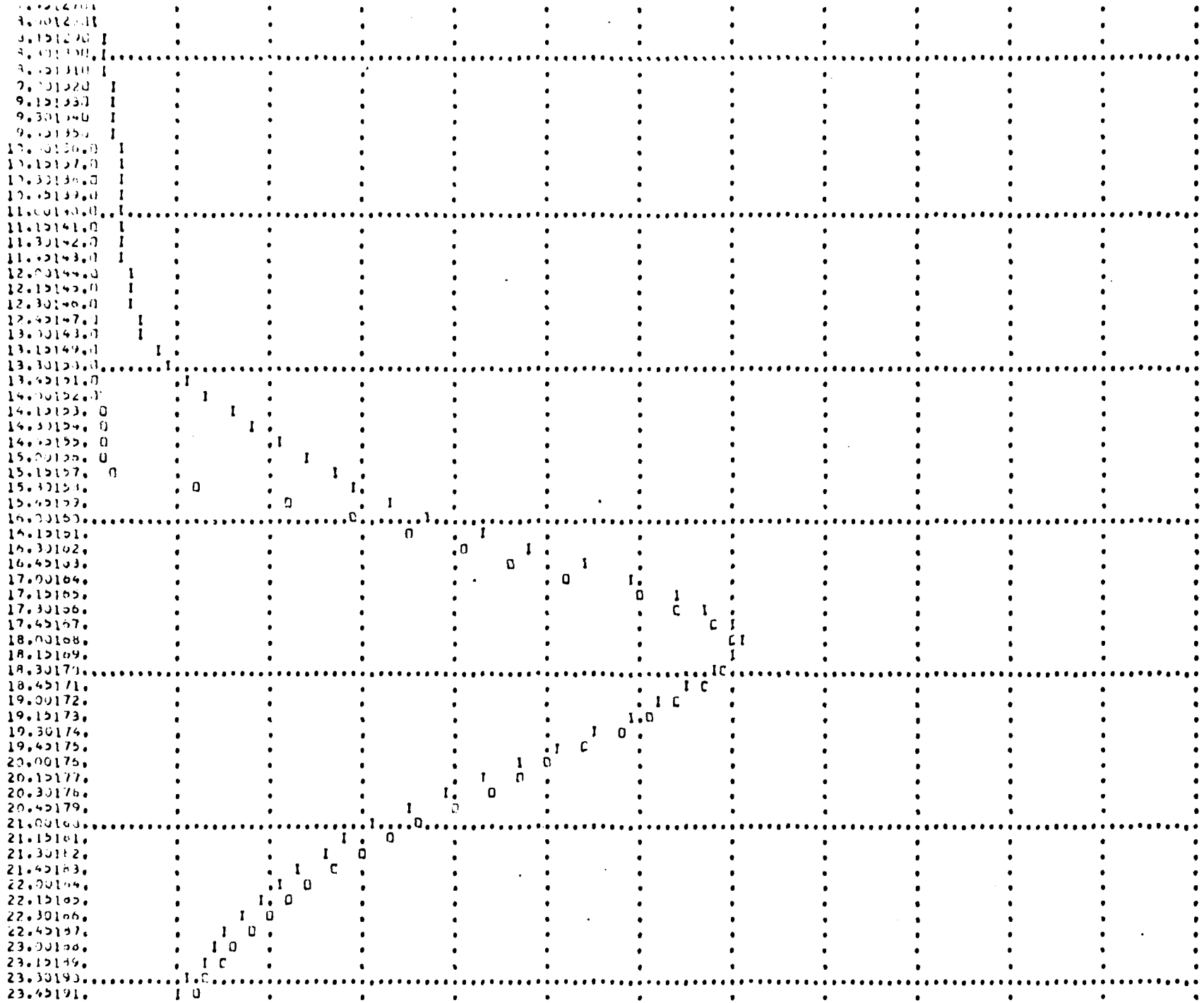
OVF

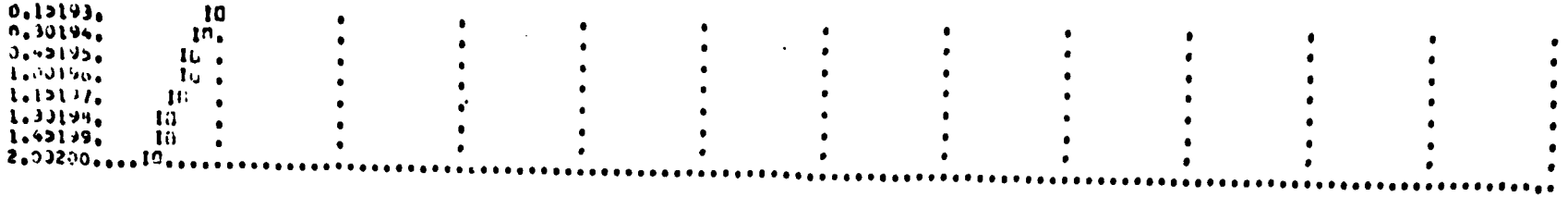
STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)





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1.45199, 10
2.00200, 10

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS					
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.40	0.50	0.60	0.80	1.00
HYDROGRAPH AT	1	1.34	1	566.	1132.	1415.	1697.	2264.	2829.
		(7287.78)		(16.02)(	32.04)(	40.06)(	48.07)(	64.09)(	80.11)(
ROUTED TO	1	1.34	1	311.	1087.	1383.	1662.	2249.	2814.
		(7287.78)		(8.81)(	30.73)(	39.09)(	47.05)(	63.68)(	79.68)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	922.30	922.30	941.60
STORAGE	11.	11.	357.
OUTFLOW	0.	0.	9682.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	936.99	0.	194.	311.	0.	44.50	0.
0.40	937.70	0.	215.	1087.	0.	42.50	0.
0.50	937.97	0.	223.	1380.	0.	42.50	0.
0.60	938.23	0.	231.	1662.	0.	42.50	0.
0.80	938.67	0.	245.	2249.	0.	42.25	0.
1.00	938.89	0.	253.	2814.	0.	42.25	0.

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.

2) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).

3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

4) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.

5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E

STABILITY ANALYSIS

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE - Soil Mechanics Laboratory
800 "J" Street, Lincoln, Nebraska 68508

SUBJECT: ENG 22-5, New York WP-08, Patterson Creek Site No. 2 (Broome County) **DATE:** October 14, 1969

TO: Richard J. Phillips, State Conservation Engineer
SCS, Syracuse, New York

ATTACHMENTS

1. Form SCS-354, Soil Mechanics Laboratory Data, 1 sheet.
2. Form SCS-128 and SCS-128A, Consolidation Curves, 1 test, 4 sheets.
3. Form SCS-127, Soil Permeability, 1 sheet.
4. Form SCS-355, Triaxial Shear Test Data, 2 tests, 2 sheets.
5. Form SCS-352, Compaction and Penetration Resistance, 3 sheets.
6. Form SCS-357, Summary - Slope Stability Analysis, 2 sheets.
7. Form SCS-130, Drain Materials, 1 sheet.
8. Investigational Plans and Profiles.

DISCUSSION OF DATA

FOUNDATION MATERIALS

A. Classification. Bedrock at the site is of Devonian age, consisting of sandstones, siltstones and shales, but was not reached by the required drilling.

The area has been glaciated, and the abutments, except for a thin mantle of topsoil, consist of till which the geologist classifies as ML-CL. During this glacial period a blockage downstream caused a deposition of lacustrine silts (ML - 85% to 90% fines) in the floodplain area, 20 to 24 feet deep. This is overlain by a stratum of alluvial GM-GC, 2 to 4 feet thick, and this in turn is overlain by a lacustrine and colluvial stratum of clayey silt (ML). Topsoil overlies the floodplain as well as the abutments.

About a 2-foot layer of SM is found, at least at the right side of the floodplain, at the contact of the deep lacustrine deposits on the underlying till.

B. Dry Unit Weight. An undisturbed foundation sample of the lacustrine ML (from Hole 352, depth 10+ feet) had densities varying from 1.56 to 1.62 g/cc (97.3 to 101.1 pcf) as determined when the core was removed from the tube and during the consolidation and shear testing. This sample was taken from a stratum where the blow counts were 9 and 10 per foot. This lacustrine deposit is logged as stiff with blow counts in Holes 51, 352, and 355 (on dam centerline) varying from 7 to 19 per foot. Blow counting upstream and downstream from the dam centerline on the two principal spillway lines showed a variation from 6 to 26 blows per foot.

The over-all average count for the lacustrine deposit is 15 per foot. For the till in the area the over-all average is 31 blows per foot.

C. Consolidation. A one-dimensional consolidation test on the lacustrine material (70W274) indicates that the 24-foot deep deposit under principal spillway location No. 1 will have a consolidation potential at the dam centerline of 0.04 ft/ft due to the load of the proposed dam.

It is estimated that the firmer, harder till has a consolidation potential of 0.015 ft/ft.

Under the proposed principal spillway No. 2, the 7-foot stratum of lacustrine material underlying the surface till has a consolidation potential of 0.036 ft/ft.

D. Permeability. A falling head permeability test which was made during the consolidation test on the lacustrine material shows it to have a vertical permeability rate of about 0.001 fpd.

The geologist has stated that the till, the deep lacustrine stratum, and the shallow lacustrine-colluvial stratum below topsoil across the floodplain are all "essentially impermeable." However, the clayey gravel stratum which lies 2 to 4 feet below the ground surface across the floodplain is highly permeable.

The investigation was conducted during a rainy season, so possibly the water tables are higher than normal. Most of the measurements across the floodplain show the level at 1.5 to 2 feet below ground level, and at 4 to 5-foot depths in the abutments.

The SM stratum under the deep lacustrine deposit is permeable. During the drilling of Hole 353 an artesian flow occurred. This flow was probably from the SM stratum.

E. Shear Strength. A consolidated undrained triaxial shear test was made on the lacustrine undisturbed sample. The test was performed on the sample as received, which was at full saturation. Resulting shear parameters are $\phi = 16.5°$, c = 1300 psf.

EMBANKMENT MATERIALS

A. Classification. Borrow from Borrow Area A in the right abutment, upstream from the dam, consists of glacial till with LL = 28 and PI = 8, a CL, and lacustrine and colluvial soil with LL = 26 and PI = 7, a CL-ML.

A sample from Borrow B in the left abutment upstream from the dam is a CL-ML with LL = 25 and PI = 7.

B. Compacted Dry Density. The till samples have standard Proctor densities of 122.5 and 120.5 pcf at optimum moistures of 12.5 and 13.5 percent. The sample of lacustrine and colluvial soil has a standard density of 111.0 pcf at 16.0 percent moisture.

C. Shear Strength. Borrow sample 70W215, the lacustrine-colluvial sample from Borrow Area A, was tested in consolidated undrained triaxial shear. Test specimens were molded at 95 percent of standard Proctor density and soaked to almost full theoretical saturation. Resulting shear parameters are $\phi = 26.5°$, $c = 625$ psf.

STABILITY ANALYSIS

The floodplain section with 27 to 28 feet of lacustrine foundation was checked for slope stability by the Swedish circle method.

Minimum factors of safety found were 2.8 for the embankment itself (upstream 3:1 slope without berm), and 2.8 for a foundation failure arc (downstream 2 1/2:1 slope with drain, depth about 19 feet into the foundation).

SETTLEMENT ANALYSIS

Differential settlements and deflections in both lower abutments at the boundary area between the lacustrine silts and the glacial till cannot be accurately ascertained with the information at hand. However, it appears that the "dovetailing" of the two materials will make the transition gradual from the lacustrine material to the till.

Total settlement of the foundation at principal spillway location No. 1 will be about 1.2 feet.

CONCLUSIONS AND RECOMMENDATIONS

A. Cutoff. Cutoff is recommended below emergency spillway elevation. In the abutments the trench should be deep enough to cut off surface disturbances and the less dense till, possibly 4 to 5 feet. Across the floodplain the trench should cut off the permeable clayey gravel stratum and bottom in the stiff clayey silt lacustrine material.

Backfill with till borrow similar to 70W214 or 70W216. Suggested placement density is 95 percent of standard Proctor at near optimum moisture. The till is suggested as backfill because the lacustrine borrow is very highly dispersed. If the lacustrine material is used, then a transition filter is suggested with a gradation similar to that shown on Form SCS-130. This should be placed on the downstream side of the cutoff backfill to prevent the lacustrine fines from being carried into the permeable GC stratum.

The ASTM Fine Concrete Aggregate Gradation, C-33, could be used instead of the above mentioned gradation.

B. Principal Spillway. It is suggested that principal spillway location proposal No. 1 not be used. A 29.5-foot high dam here with a total base width of 186.2 feet, and a foundation about 30 feet deep with a consolidation potential of 0.04 ft/ft would cause a horizontal elongation in the pipe of about 0.012 ft/ft.

At proposed location No. 2, settlement at the dam centerline will be about 0.6 foot (with the estimated consolidation potential of 0.015 ft/ft in the till) and the maximum unit horizontal elongation will be on the order of 0.0055 ft/ft.

Backfill with borrow similar to 70W215 (103.1). Suggested placement density is 95 percent of standard Proctor at near optimum moisture. Spillway backfill should be tied in well with that of the cutoff.

Use a ϕ-angle of 30° for conduit loading computations.

C. Drainage. Drainage is recommended at the c/b = 0.6 point below permanent pool elevation. A trench 4 to 5 feet deep is suggested in the abutments, and deep enough in the floodplain to intercept the full depth of the permeable GC stratum.

To prevent piping out of the lacustrine materials a double filter is suggested. The ASTM Fine Concrete Aggregate C-33 together with ASTM No. 78 Road Gravel would be satisfactory gradations.

D. Embankment Design. Selectively place the highly dispersed, erodible lacustrine soils in the interior of the dam, with the less erodible till soils as outside cover.

It is suggested the borrow be placed at 95 percent of standard Proctor density at near optimum moisture, with control on the minus No. 4 fraction.

Satisfactory factors of safety are provided with the suggested 3:1 upstream slope with a 10-foot berm, and the 2 1/2:1 downstream slope.

An overbuild of 1.3 feet is suggested to compensate for residual settlement of the embankment and foundation.

Prepared by:

Carl G. Nygren

Carl G. Nygren

Reviewed and Approved by:

Lorn P. Dunnigan, Head,
Soil Mechanics Laboratory

Attachments

cc:
Richard J. Phillips (1)
Bernard S. Ellis, Syracuse, N.Y.
Donald Shanklin, Binghamton, N.Y.
Neil F. Bogner, Upper Darby, Pa.

Form SCS-354, Rev. 3/59

3/24/69 & 7/22/69 — NEW YORK — Ht. = 30' — 37,940 cy — Class "C" Flood Prevention

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA

Sheet 1 of 1

Patterson Creek Site: 2

MECHANICAL ANALYSIS — GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT

Laboratory Sample Number	Field Number	Location and Description	Depth	Field Classification	Fines .002 mm	.005	.02	.05	#200 .074	Sand #140 .105	#60 .250	#40 .42	#20 .84	#10 2.0	#4 4.76	Gravel 3/8"	1/2"	3/4"	1"	1 1/2"	3"	Atterberg LL	PI	Unified Classification	Soluble Salts %	Dispersion %	Curve No.	Max γ_d pcf	W_o %	Undisturbed γ_d g/cc	W_o %	G_s	Special Tests
70W																																	
214	102.1	Borrow Area A * L. Bag; Glacial till Mt'l A	1-14.5	ML-CL	[illegible]	[illegible]	[illegible]	[illegible]	60	61	64	65	68	72	84	[illegible]	71	94	96	98	100	23	3	CL		Tr.	(1)	122.5	12.5			2.71	Dry density < No. 4; Minus No. 4; Gravel fraction: 2.72 apparent, 2.5? bulk dry, 2.2 % absorption; 132.? Pcf
215	103.1	Borrow Area A L. Bag; 65,000 cy; Lacustrine & colluvial Mt'l B	5-8.5'	ML	[illegible]	41	71	93	9?					100								26	7	CL-ML		[illegible]	(2)	111.0	16.0			[illegible]	✓
216	111.1	Borrow Area B* L. Bag; Glacial till Mt'l C	5'-?	ML-CL	12	22	41	53	57	60	61	63	66	69	74	78	82	87	91	95	100	25	7	CL-ML		8	(3)	125.5	13.5			2.6?	Dry density < No. 4; Minus No. 4; Gravel fraction: 2.71 apparent, 2.53 bulk dry, 2.5 % absorption; 132.? Pcf
Recd. 3/24/69																																	
274	352A-1	Brixius Core; Lacustrine Mt'l D	10'+	ML	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]													24	5	CL-ML		78	[illegible]	[illegible]	6½; 9½	[illegible]	[illegible]	2.77	✓ ✓

*111.1, 102.1 = 39,000 cy

LABORATORY NO

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	CONSOLIDATION TEST

PROJECT and STATE			SAMPLE LOCATION
			BRIXUS
FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE

CLASSIFICATION

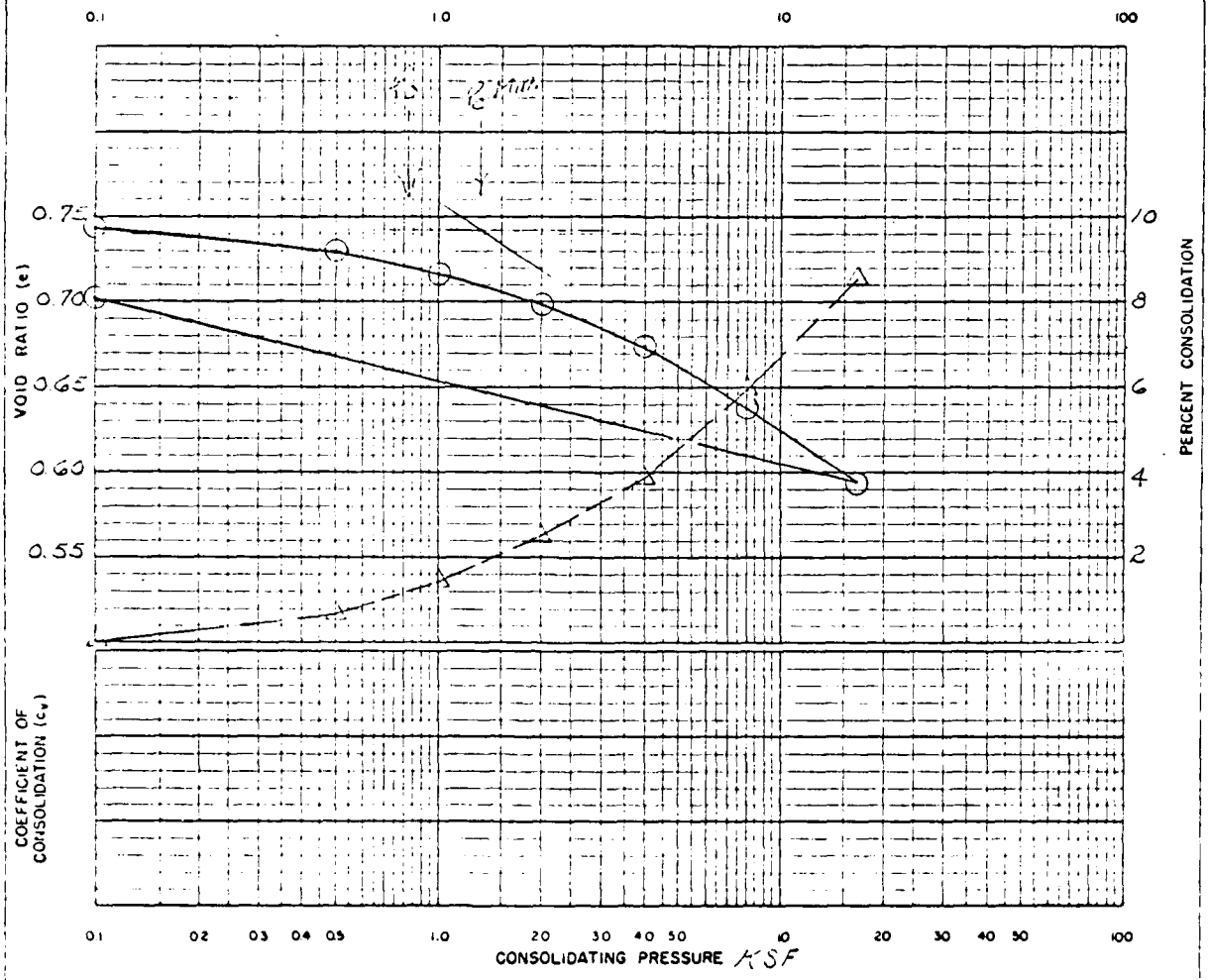
G_s LL PI

INITIAL DENSITY γ_d

INITIAL VOID RATIO, e_o

COMPRESSION INDEX, C_c

TEST SPECIFICATIONS:
Saturated at Start

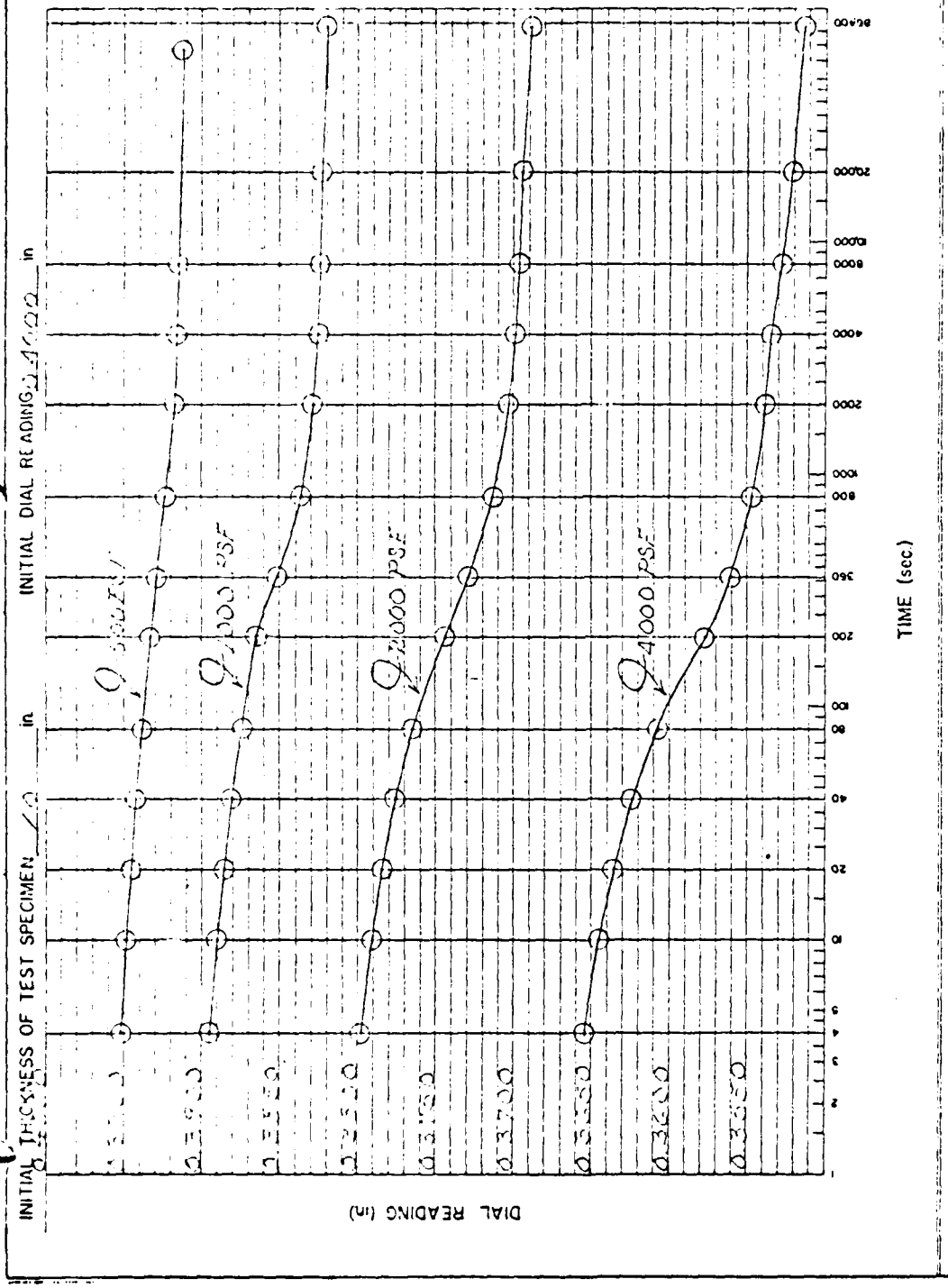


REMARKS

LABORATORY NO.

MATERIALS TESTING REPORT	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	LOG TIME CONSOLIDATION

PROJECT and STATE			SAMPLE LOCATION
FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE



REMARKS

LABORATORY NO 70-1224

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	LOG TIME CONSOLIDATION

PROJECT and STATE		SAMPLE LOCATION
SARATOGA SPRINGS, N.Y.		SPRING
FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN
	10.5'-+	
TYPE OF SAMPLE	TESTED AT	APPROVED BY / DATE
UNDISTURBED	SARATOGA	

INITIAL THICKNESS OF TEST SPECIMEN 1.0 in. INITIAL DIAL READING 0.4000 in.

DIAL READING (in)

0.3400 0.3350 0.3300 0.3250 0.3200 0.3150 0.3100 0.3050

TIME (sec)

1 2 4 5 10 20 40 80 100 200 300 800 1000 2000 4000 8000 20,000 86400

2,000 PSF

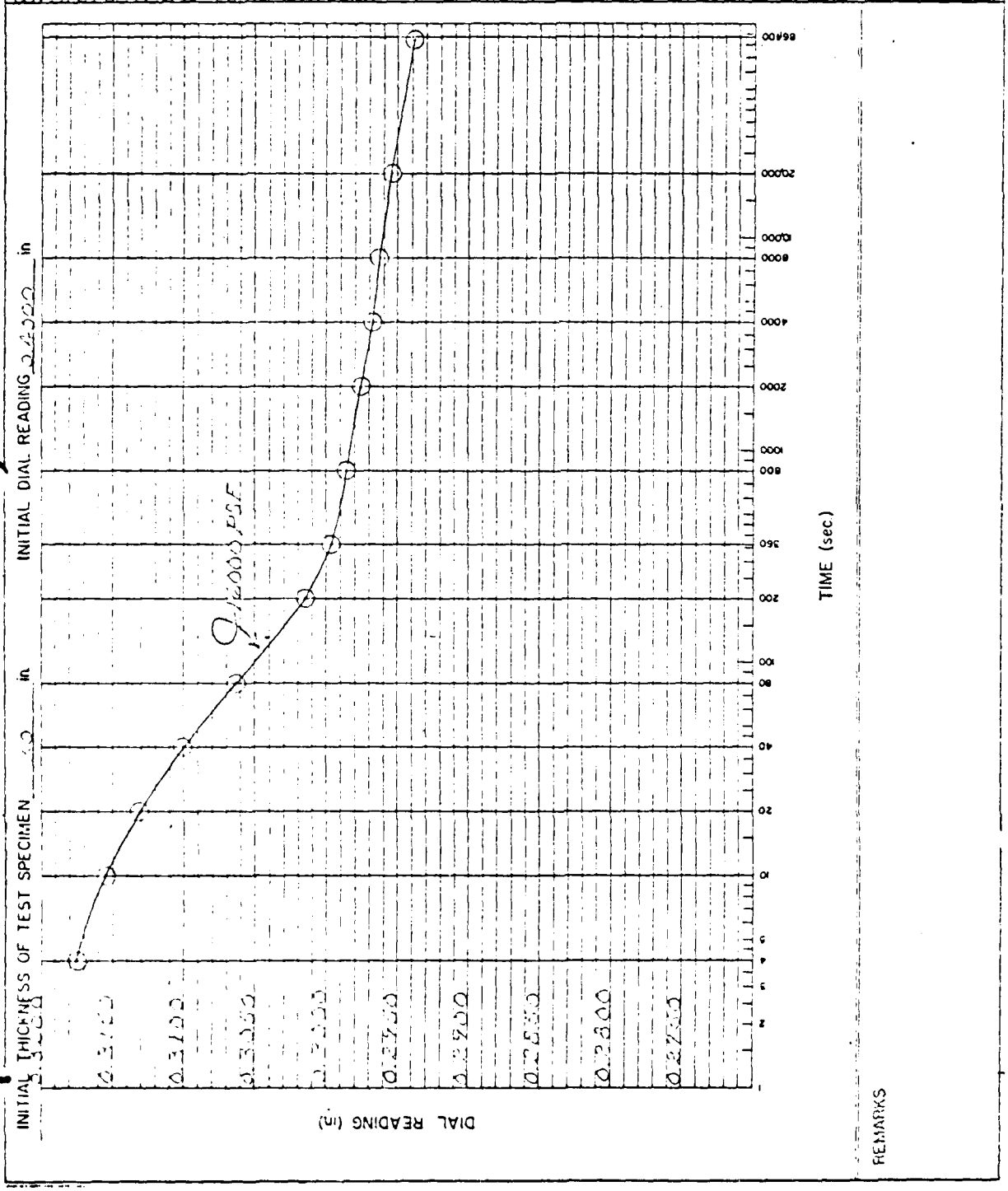
REMARKS

FORM SCS 28A
9-64

LABORATORY NO 70N224

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	LOG TIME CONSOLIDATION

PROJECT and STATE			SAMPLE LOCATION
BUTTERMILK CREEK, NO 2, NEW MEX			BORING
FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN	
[illegible]	[illegible]		
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
UNDISTURBED	SAN [illegible]		



REMARKS

LABORATORY NO [illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL PERMEABILITY

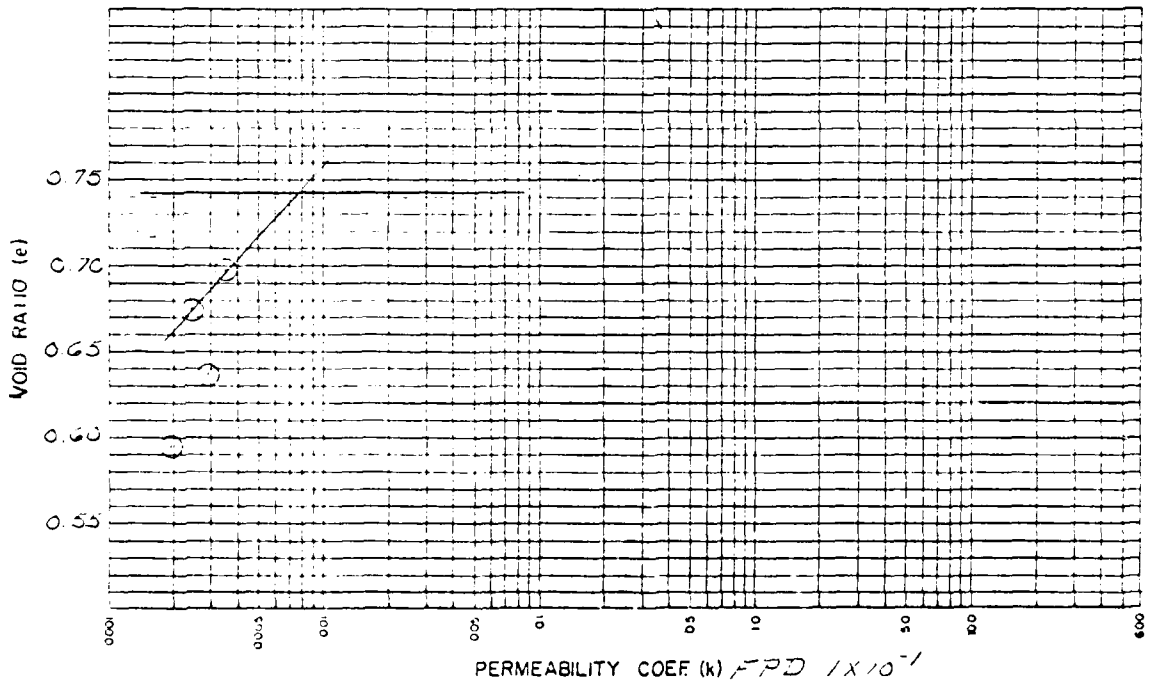
PROJECT and STATE			SAMPLE LOCATION
[illegible]			[illegible]
FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN	
[illegible]	[illegible]		
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
[illegible]	[illegible]		

CLASSIFICATION CL-ML LL 24 PI 5

SPECIFIC GRAVITY

TEST NO	[illegible]	[illegible]	[illegible]	[illegible]	G_s (-) #4	2.77
INITIAL MOISTURE %					G_s (+) #4	
DRY DENSITY ☒ g/cc ☐ pcf	[illegible]	[illegible]	1.69	1.74	G_m(Bulk)(+) #4	
VOID RATIO	[illegible]	[illegible]	[illegible]	[illegible]		
PERMEABILITY COEF FPD	[illegible]	[illegible]	[illegible]	0.00012		
PERCOLATION COEF						
$H/_L$ DURING TEST						

TEST SPECIFICATIONS
Falling Head Rim Test on the Consolidation Sample



REMARKS ~ = approx 0.001 fpd

Form SCS 355A
Rev 6-65

LABORATORY NO [illegible]

MATERIALS TESTING REPORT	U.S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE [illegible]

SAMPLE LOCATION [illegible]

FIELD SAMPLE NO	DEPTH	GEOLOGIC ORIGIN
[illegible]	[illegible]	

TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
[illegible]			

INDEX TEST DATA

USCS [illegible]; LL 36; PI 7

% FINER (mm): 0.002 [illegible]; 0.005 [illegible];
0.074 (#200) 85

G_s (-#4) [illegible]; G_s (+#4) [illegible]

STANDARD: γ_d MAX. 111.0 pcf; w_o 16.0%

MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

SPECIMEN DATA

HEIGHT 3.0"; DIAMETER 1.4"

MATERIALS TESTED PASSED [illegible] SIEVE

METHOD OF PREPARATION MOLDED BY TAMPING IN 5 LIFTS (SOAKED)

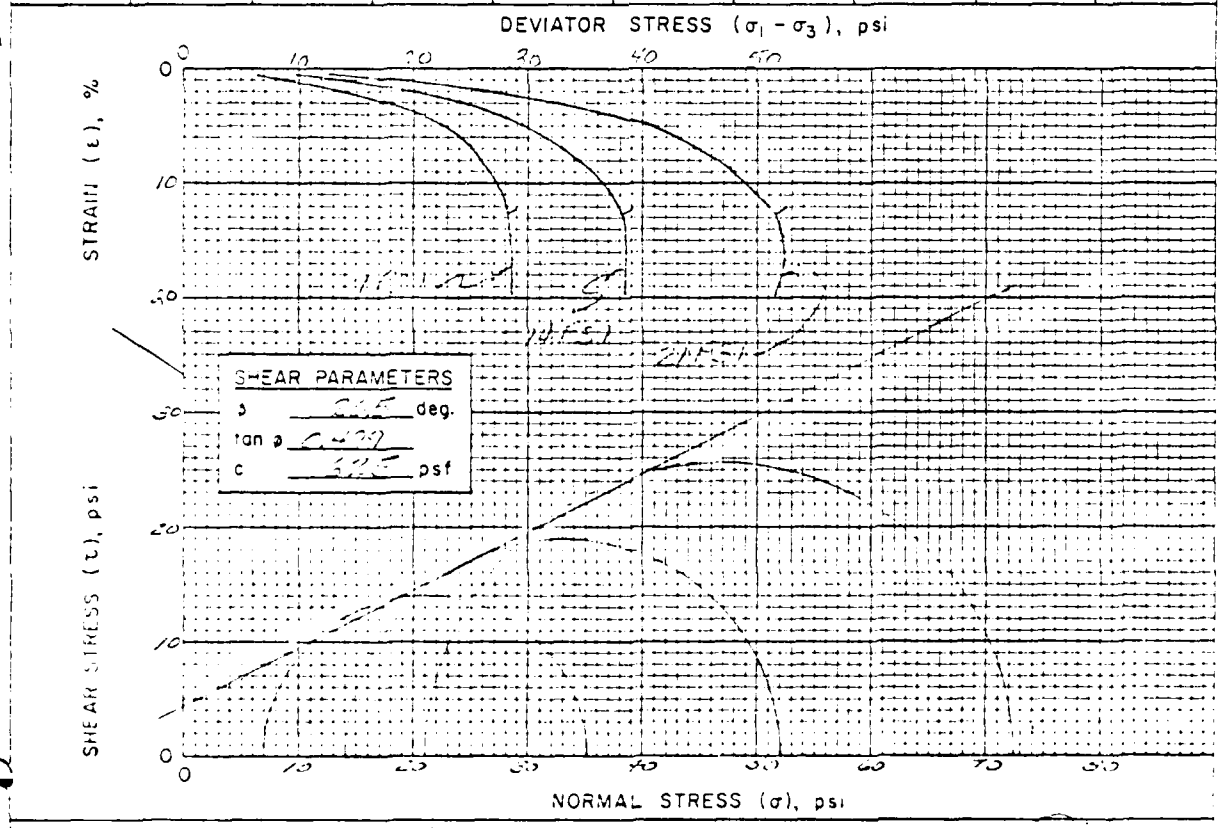
MOLDING MOISTURE 17.5 %

MOLDED AT 95.0% OF γ_d MAXIMUM

TYPE OF TEST

UU ☐ CU ☑ $\overline{CU}$ ☐ CD ☐

DRY DENSITY		MOISTURE CONTENT, %			TIME OF CONSOLI-DATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
INITIAL pcf ☐ g/cc ☐	CONSOLI-DATED pcf ☑ g/cc ☐	START OF TEST	DEG. OF SAT. AT START OF TEST	END OF TEST				
106.2	106.4	21.6	99.5	21.6	5.62	7	28.1	12.8
105.2	106.7	22.2	99.6	21.4	5.53	14	38.1	12.7
106.4	108.5	21.8	99.5	20.7	5.88	21	51.5	12.8



REMARKS TESTED @ 95.0% STD

[illegible]

Form SCS 355-A
Rev. 1-65

LABORATORY NO [illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	TRIAXIAL SHEAR TEST

PROJECT and STATE [illegible] SAMPLE LOCATION PITTSBURG

FIELD SAMPLE NO [illegible] DEPTH [illegible] GEOLOGIC ORIGIN

TYPE OF SAMPLE [illegible] TESTED AT [illegible] APPROVED BY DATE

INDEX TEST DATA

USCS [illegible]; LL 31; PI 5

% FINER (mm): 0.002 22; 0.005 37;
0.074 (# 200) 100

G_s (-#4) 2.70; G_s (+#4) _____

STANDARD: γ_d MAX. _____ pcf; w_o _____ %

MODIFIED: γ_d MAX. _____ pcf; w_o _____ %

SPECIMEN DATA

HEIGHT 2.0"; DIAMETER 1.4"

MATERIALS TESTED PASSED #4 SIEVE

METHOD OF PREPARATION TRIMMED
[illegible] AND TESTED @ N.M.C.

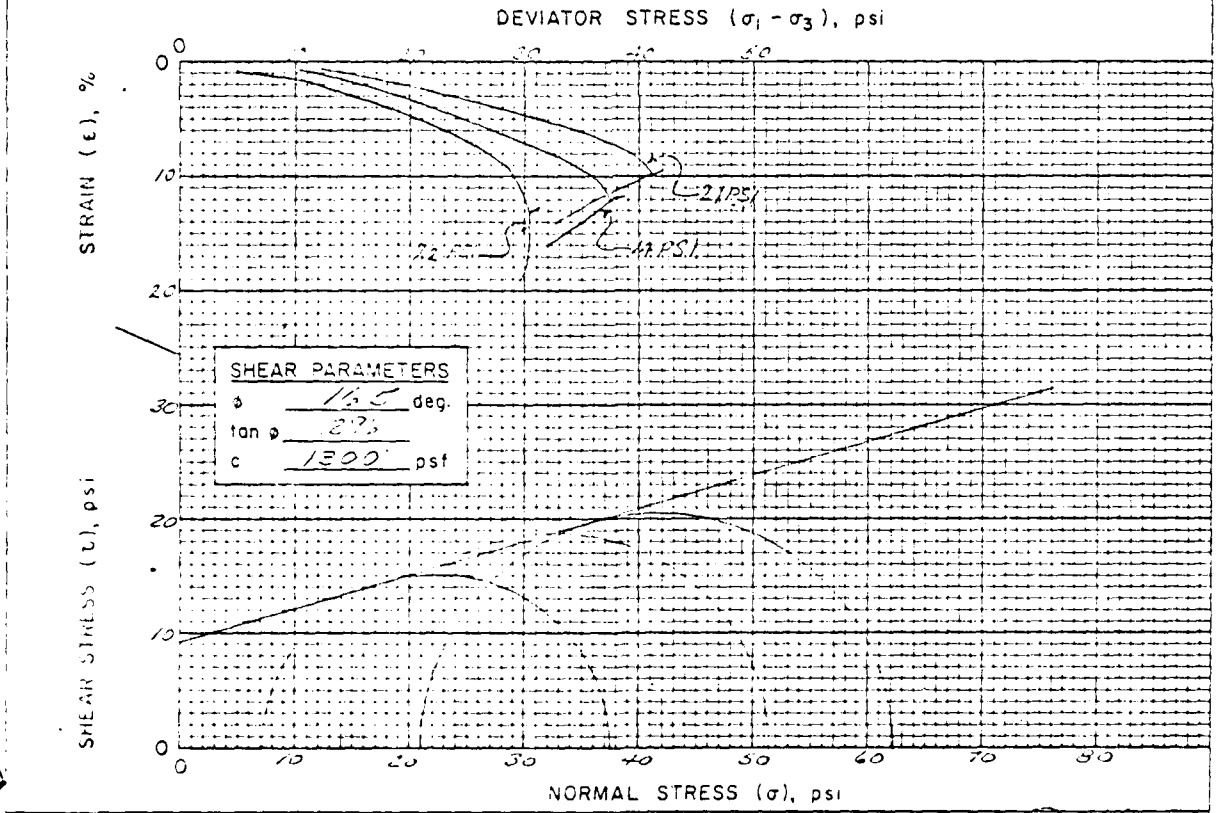
MOLDING MOISTURE _____ %

MOLDED AT _____ % OF γ_d MAXIMUM

TYPE OF TEST

UU ☐
CU ☑
$\overline{CU}$ ☐
CD ☐

DRY DENSITY			MOISTURE CONTENT, %			TIME OF CONSOLI-DATION (hrs.)	MINOR PRINCIPAL STRESS σ_3 (psi)	DEVIATOR STRESS $\sigma_1 - \sigma_3$ (psi)	AXIAL STRAIN AT FAILURE, ε (%)
INITIAL pcf ☐ g/cc ☑	CONSOLI-DATED pcf ☐ g/cc ☑		START OF TEST	DEG. OF SAT. AT START OF TEST	END OF TEST				
1.62	1.62		26.3	100.0	26.3	16.85	7.2	30.3	13.2
1.62	1.62		25.5	100.0	25.2	17.37	14	37.4	12.0
1.61	1.65		26.1	100.0	25.6	19.63	21	41.1	9.9



REMARKS TESTED @ NATURAL MOISTURE

LABORATORY NO. 70-02-17

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT OR SITE: Patterson Creek, Site 2, New York.

FIELD SAMPLE NO.	LOCATION	DEPTH
1021 MAT. A	Borrow Area A.	1 - 14.5'.

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SML-LINCOLN		

CLASSIFICATION CL LL 26 PI 5

MAX. PARTICLE SIZE INCLUDED IN TEST < #4 "

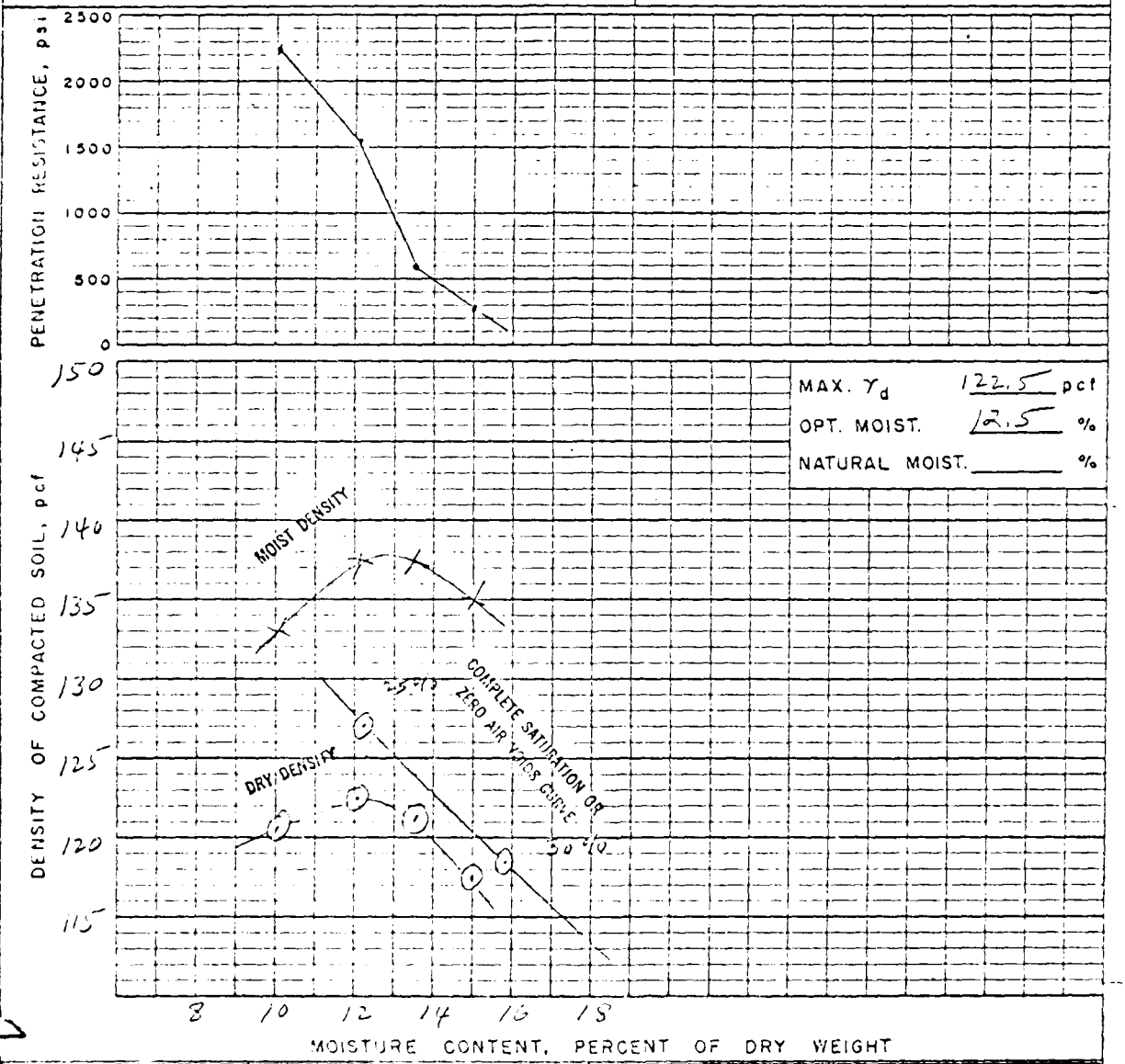
SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.71 ; PLUS NO. 4 2.72

CURVE NO. 1 OF 3

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD _____

OTHER TEST ☐ (SEE REMARKS)



REMARKS

CURVE IS FOR THE MINUS NO. 4 FRACTION

GRADATION OF TOTAL SAMPLE

< NO. 200 [illegible] ; < NO. 4 33 ; < 3/4 IN. 100

7-1021

COMPACTION AND TESTING REPORT SOIL CONSERVATION SERVICE PENETRATION RESISTANCE

PROJECT
Pleasantville Creek, Site 2, New York

FIELD SAMPLE NO. 103 MAP OR LOCATION Boring No. 2 Auger DEPTH 0.5 - 2.5'

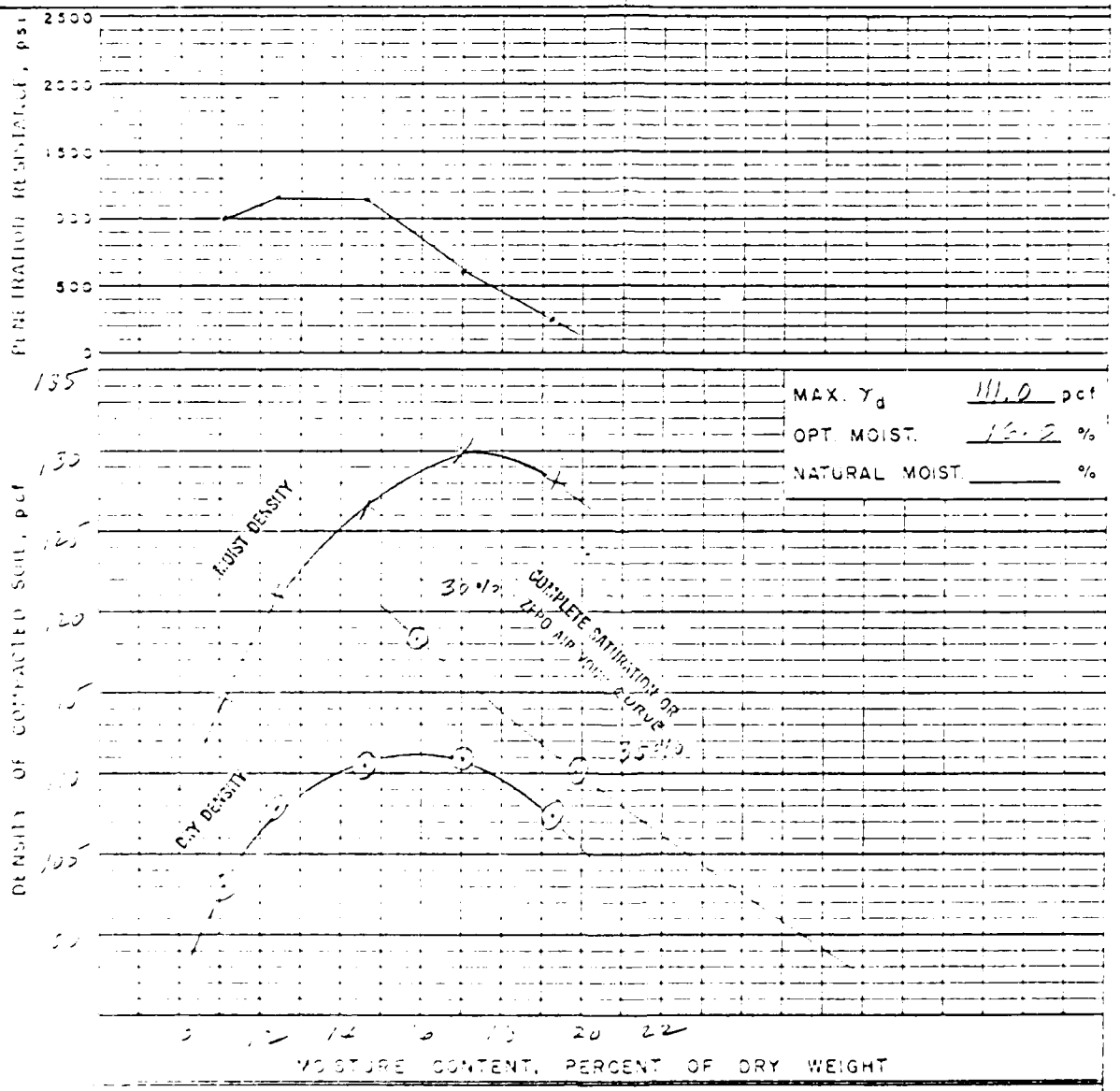
DESIGN OF DAM TESTED BY SML-LINCOLN APPROVED BY DATE

CLASSIFICATION SC-SM LL 26 PI 7 CURVE NO. 2 OF 5

MAX. PARTICLE SIZE INCLUDED IN TEST 4 #4 " STD (ASTM D-698) ☒; METHOD A

SPECIFIC GRAVITY (G_s) MINUS NO. 4 2.71 MOD (ASTM D-1557) ☐; METHOD

PLUS NO. 4 OTHER TEST ☐ (SEE REMARKS)



LABORATORY NO. 70-1216

MATERIALS TESTING REPORT	U.S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT OR STATE: Emerson Creek, Site 2, New York

FIELD SAMPLE NO.	LOCATION	DEPTH
Mat. 'A'	Borrow Area 3.	5' - 7'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	SML-LINCOLN		

CLASSIFICATION CL-ML LL 25 PI 7 | CURVE NO. 3 OF 3

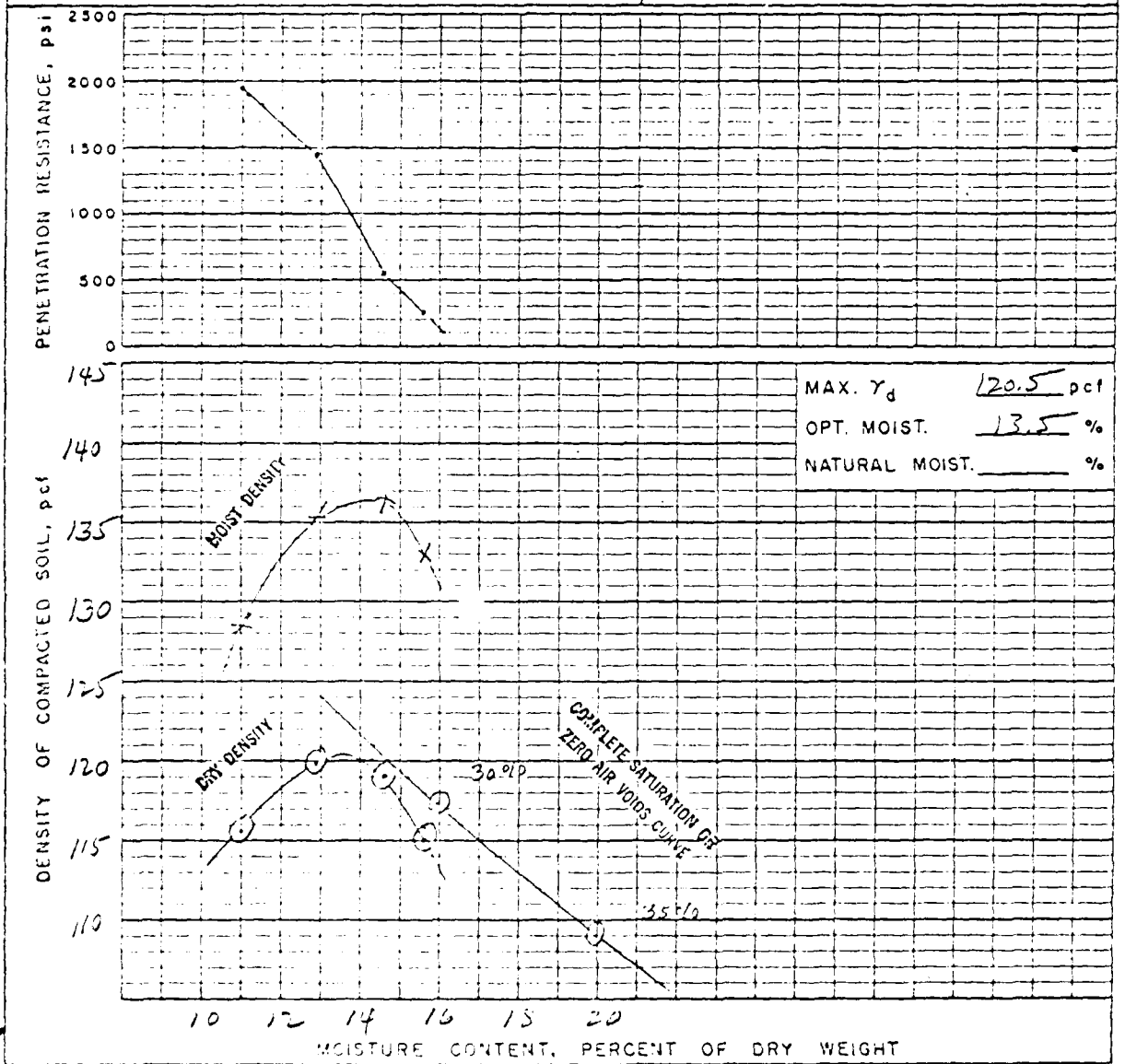
MAX. PARTICLE SIZE INCLUDED IN TEST 2" #4

SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.69 ; PLUS NO. 4 2.71

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD

OTHER TEST ☐ (SEE REMARKS)



MAX. γ_d 120.5 pcf

OPT. MOIST. 13.5 %

NATURAL MOIST. ____ %

REMARKS: CURVE IS FOR THE MINUS NO. 4 FRACTION

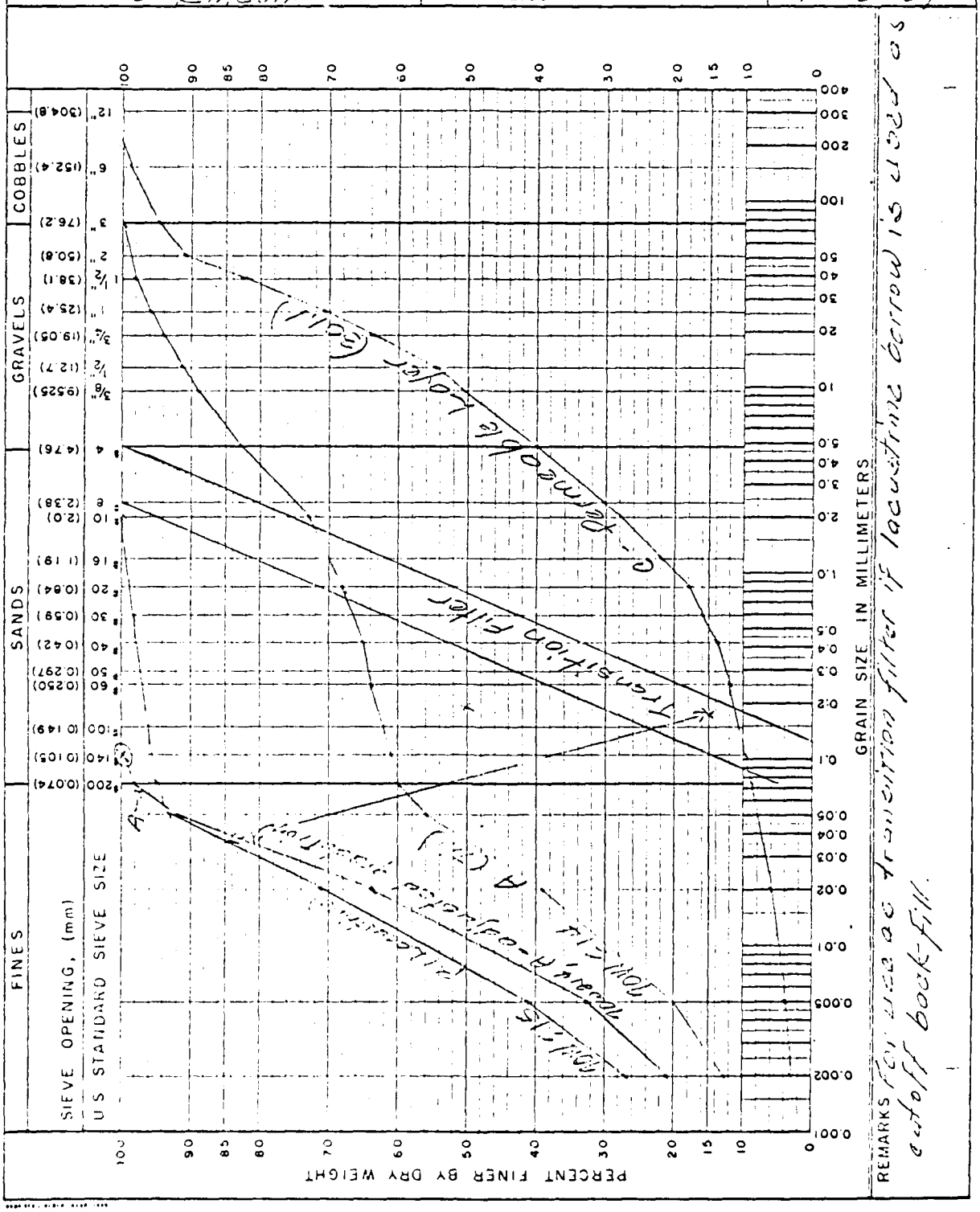
GRADATION OF TOTAL SAMPLE

< NO. 200 ___ %, < NO. 4 ___ %, < 3 IN. 100 %

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	DRAIN MATERIALS

PROJECT and STATE: Fowler Jr. Hornell, New York

DESIGNED AT: Ithaca, Lincoln | BY: CAN | DATE: 12-6-59



REMARKS: Poorly graded filter is acceptable because of its coarseness as backfill.

Form [illegible] 357
Rev 6-[illegible]

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SUMMARY - SLOPE STABILITY ANALYSIS

PROJECT and STATE: [illegible] CREEK SITE #[illegible] NEW YORK

DATE: 9-2-69

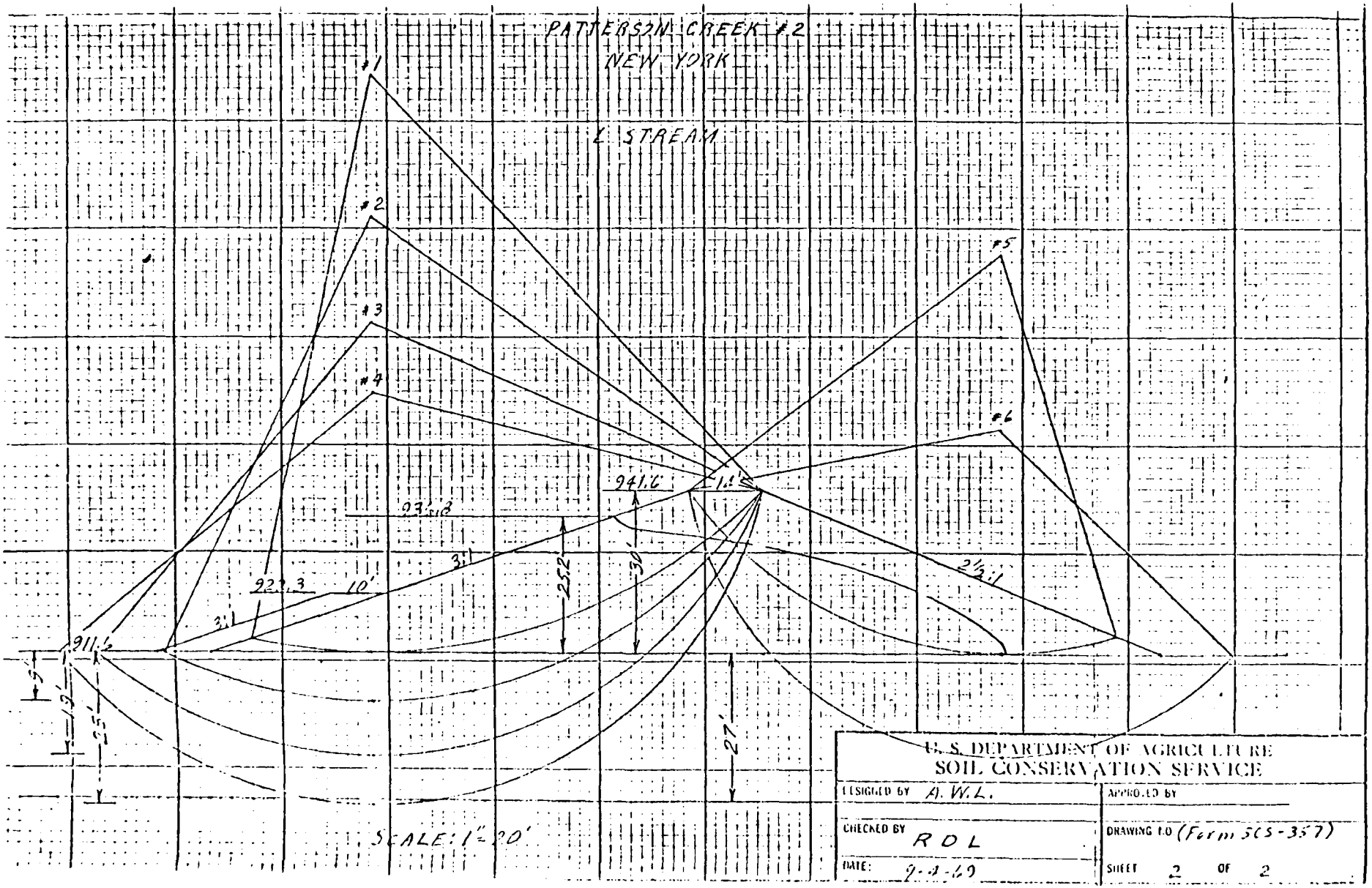
METHOD OF ANALYSIS: SWEDISH CIRCLE

ANALYZED AT: S.C. by LINCOLN, NEB.

APPROVED BY:

TRIAL NO	SLOPE	CONDITIONS	F_s	REMARKS
1	3:1	Full reservoir - No berm - Arc cut thru emb. (26.5°-62.5°) only	2.5	
2	3:1	Full reservoir - No berm - Arc cut thru emb. (26.5°-62.5°) & found (26.5°-132°)	2.6	
3	3:1	Full reservoir - No berm - Arc cut thru emb. (26.5°-62.5° & 19°-62.5°) & found (26.5°-132°)	2.9	
4	3:1	Full reservoir - No berm - Arc cut thru emb. (26.5°-62.5°) & found (26.5°-132°)	2.2	
5	2.5:1	Drawn 2.5/3 = 2.1 - No berm - Arc cut thru emb (26.5°-62.5°) only	3.0	
6	2.5:1	Drawn 2.5/3 = 2.6 - No berm - Arc cut thru emb (26.5°-62.5°) & found (26.5°-132°)	2.3	

	SOURCE AND USE OF MATERIALS	CLASSIFICATION	γ_d (pcf)	γ_m (pcf)	ADOPTED DESIGN DATA γ_{sat} (pcf)	γ_{sub} (pcf)	ϕ (deg)	tan ϕ	c (psf)
①	Found	CL-ML	121.1		123.5	61.0	22.5	0.414	1300
②	Emb. fill	CL-ML	125.2	133.2	134.2	72.0	22.5	0.414	1300
③									
④									
⑤									
⑥									
⑦									
⑧									

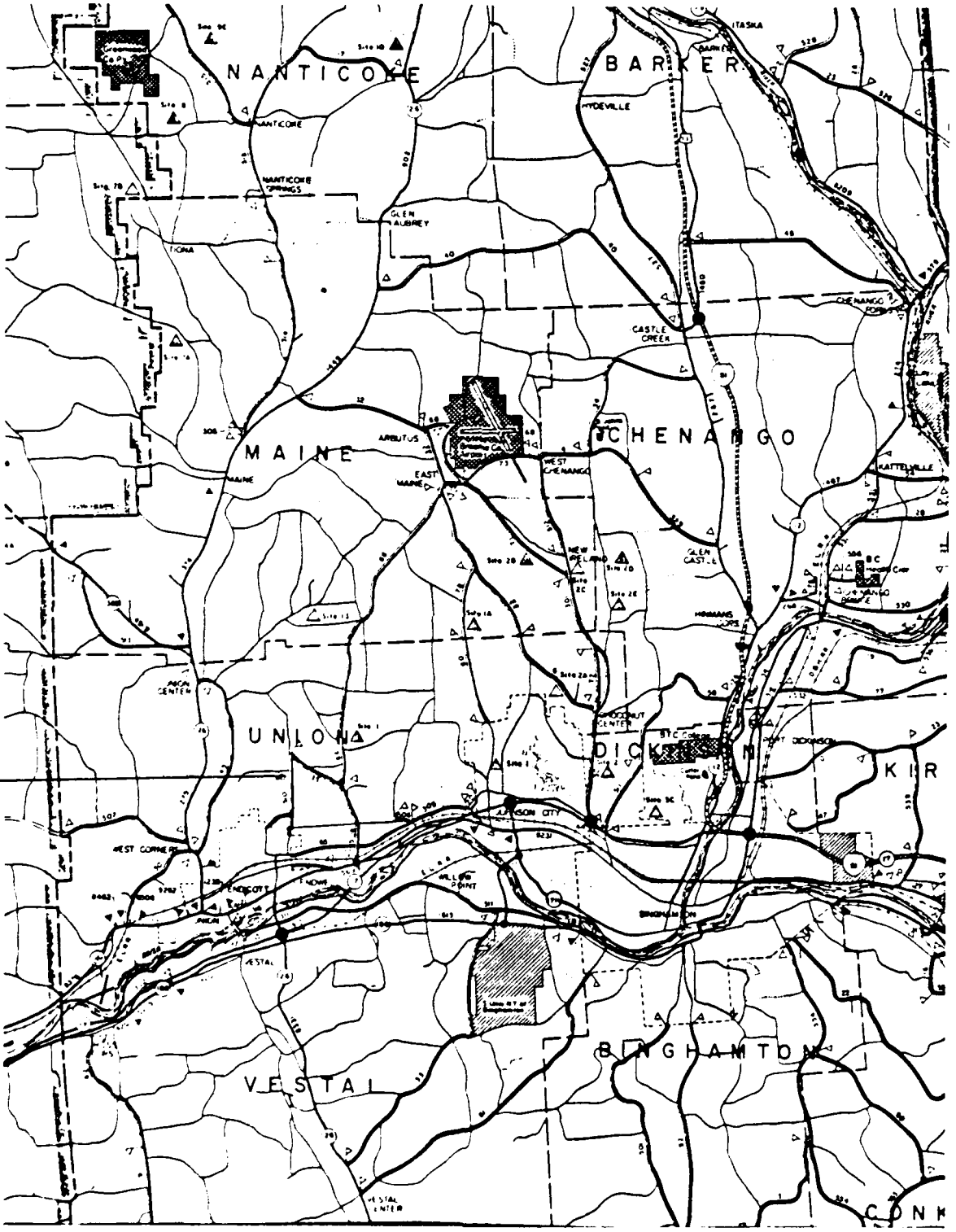


U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

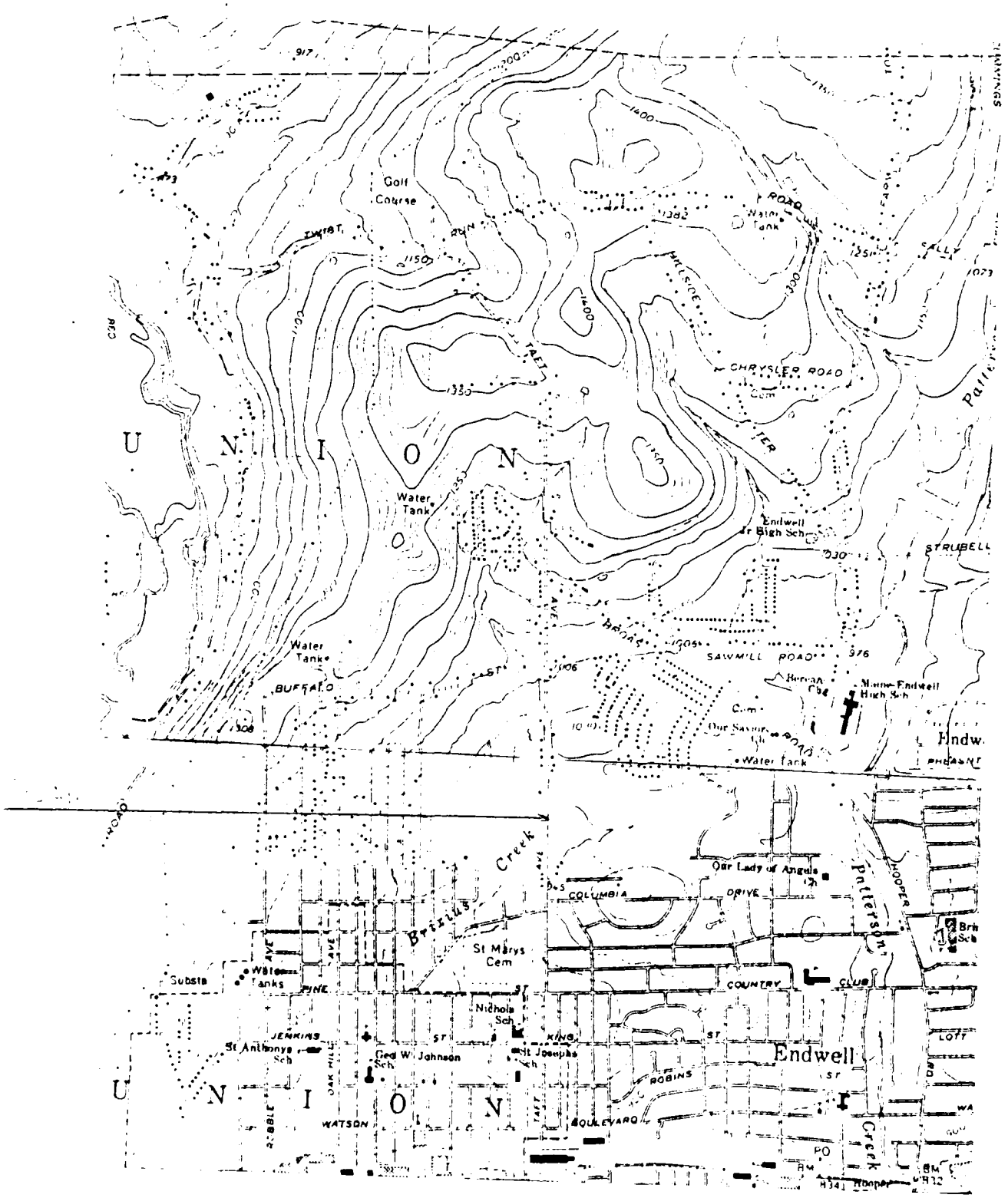
DESIGNED BY A. W. L.	APPROVED BY
CHECKED BY R O L	DRAWING NO (Form SCS-357)
DATE: 9-3-49	SHEET 2 OF 2

APPENDIX F

DRAWINGS



VICINITY MAP



TOPOGRAPHIC MAP

PATTERSON BRIXIUS & GREY CREEK WATERSHED PROJECT

FLOODWATER RETARDING DAM NO. 2

DRAINAGE AREA	860 ACRES
FLOOD STORAGE TO EMERGENCY SPILLWAY CREST	188 ACRE FT
WATER SURFACE AREA AT SEDIMENT POOL	58~~8~~ ACRES
HEIGHT OF DAM	30 FEET
VOLUME OF FILL	56,949 ~~54,100~~ CUBIC YARDS

BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY

COUNTY OF BROOME

WITH THE ASSISTANCE OF THE

SOIL CONSERVATION SERVICE

OF THE

U S DEPARTMENT OF AGRICULTURE

INDEX

GREY CREEK
ROJECT
DAM NO. 2

860 ACRES
188 ACRE FT.

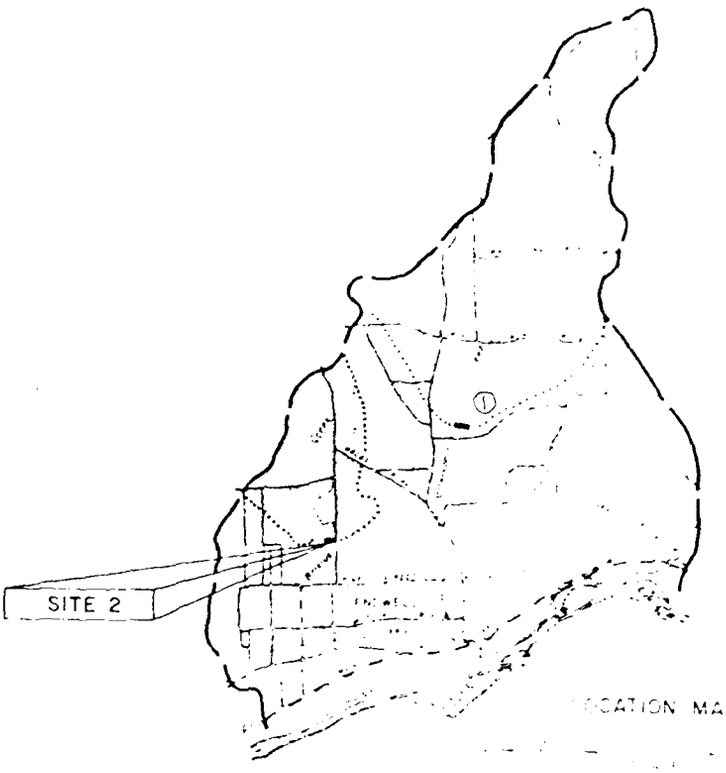
58~~8~~ ACRES

30 FEET
~~54,100~~ CUBIC YARDS

PROTECTION AND
ACT

ME
F THE
RVICE

CULTURE



LOCATION MAP

WS-12-72
6/25/73
AS BUILT

PATTERSON BRANCH-UPPER
WATERSHED PROJ
COVER SHE
U.S. DEPARTMENT
SOIL CONSER

TAFT AVENUE

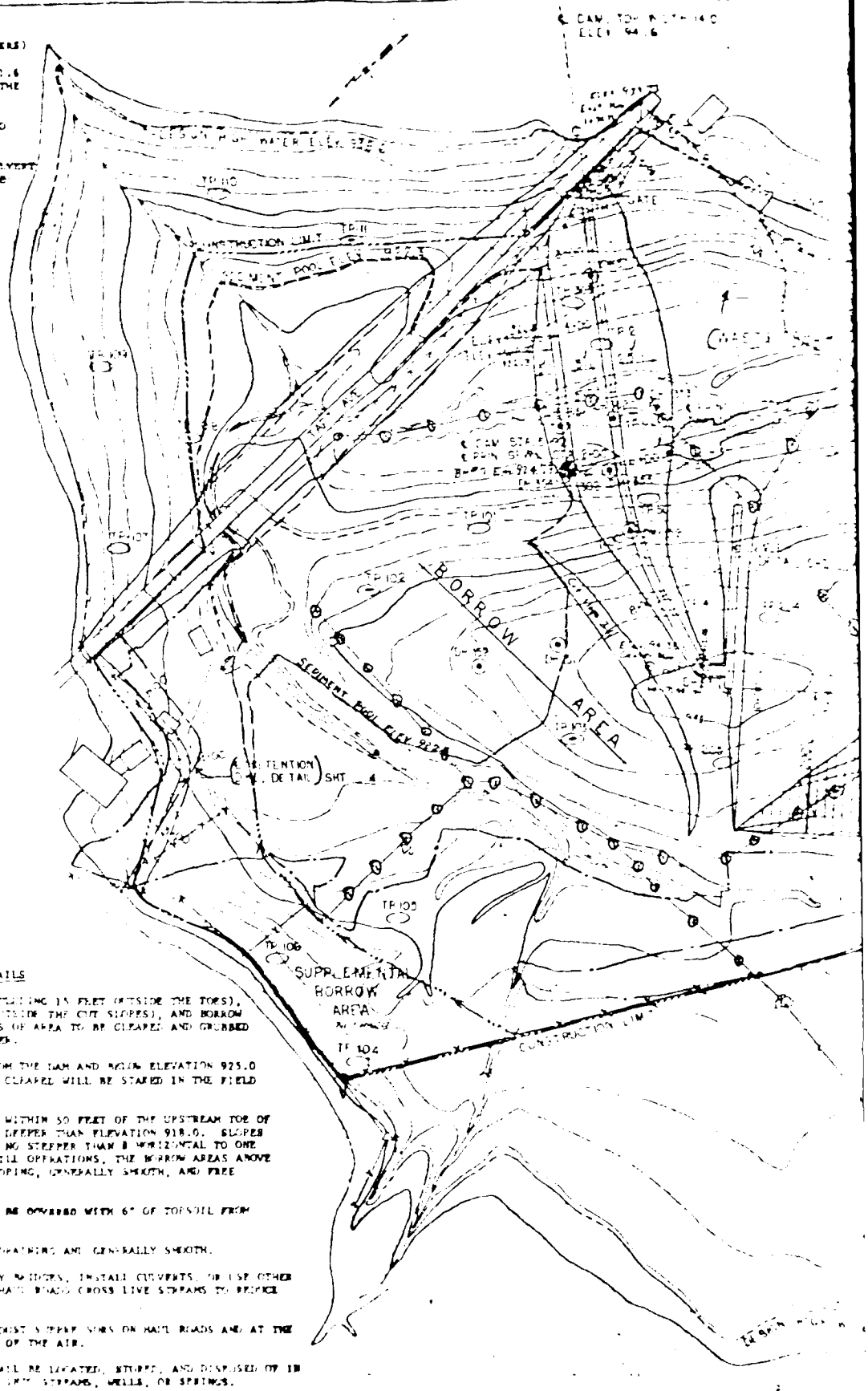
(DETAILS TO BE COMPLETED BY OTHERS)

1. TAFT AVENUE TO BE RAISED TO ELEVATION 941.6 IN THE VICINITY OF THE SOUTHEAST END OF THE DAM.

2. THE REMAINDER OF TAFT AVENUE TO BE RAISED TO ELEVATION 938.6.

3. ~~DUE TO ELIMINATION OF THE WESTBOUND CULVERT UNDER TAFT AVENUE, A NEW CHANNEL SHALL BE CONSTRUCTED PARALLEL TO THE WEST SIDE OF TAFT AVENUE IN THE AREA BETWEEN THE TWO EXISTING CULVERTS.~~

NOTE: ~~SUPERELEVATION CURVES NOT SHOWN.~~



CONSTRUCTION DETAILS

1. AREAS UNDER THE DAM (DIKE) AND DIKE (INCLUDING 15 FEET OUTSIDE THE TOES), EMERGENCY SPILLWAY (INCLUDING 15 FEET OUTSIDE THE CUT SLOPES), AND BORROW AREA TO BE CLEARED AND GRUBBED. LIMITS OF AREA TO BE CLEARED AND GRUBBED TO BE STAKED IN THE FIELD BY THE ENGINEER.

2. THE WASTE AREA AND THE AREA UPSTREAM FROM THE DAM AND BELOW ELEVATION 925.0 SHALL BE CLEARED. LIMITS OF AREA TO BE CLEARED WILL BE STAKED IN THE FIELD BY THE ENGINEER.

3. BORROW EXCAVATION SHALL BE CONFINED WITHIN 50 FEET OF THE UPSTREAM TOE OF THE DAM. BORROW EXCAVATION SHALL BE NO DEEPER THAN ELEVATION 918.0. SLOPES OF THE SIDES OF THE BORROW AREA SHALL BE NO STEEPER THAN 3 HORIZONTAL TO ONE VERTICAL. AT THE COMPLETION OF EARTH FILL OPERATIONS, THE BORROW AREAS ABOVE ELEVATION 925.0 SHALL BE LEFT GENTLY SLOPING, GENERALLY SMOOTH, AND FREE DRAINING.

4. BOTTOM SURFACE OF PAVEMENT SPILLWAY TO BE COVERED WITH 6" OF TOPSOIL FROM STA 2+45 TO APPROX STA 7+00.

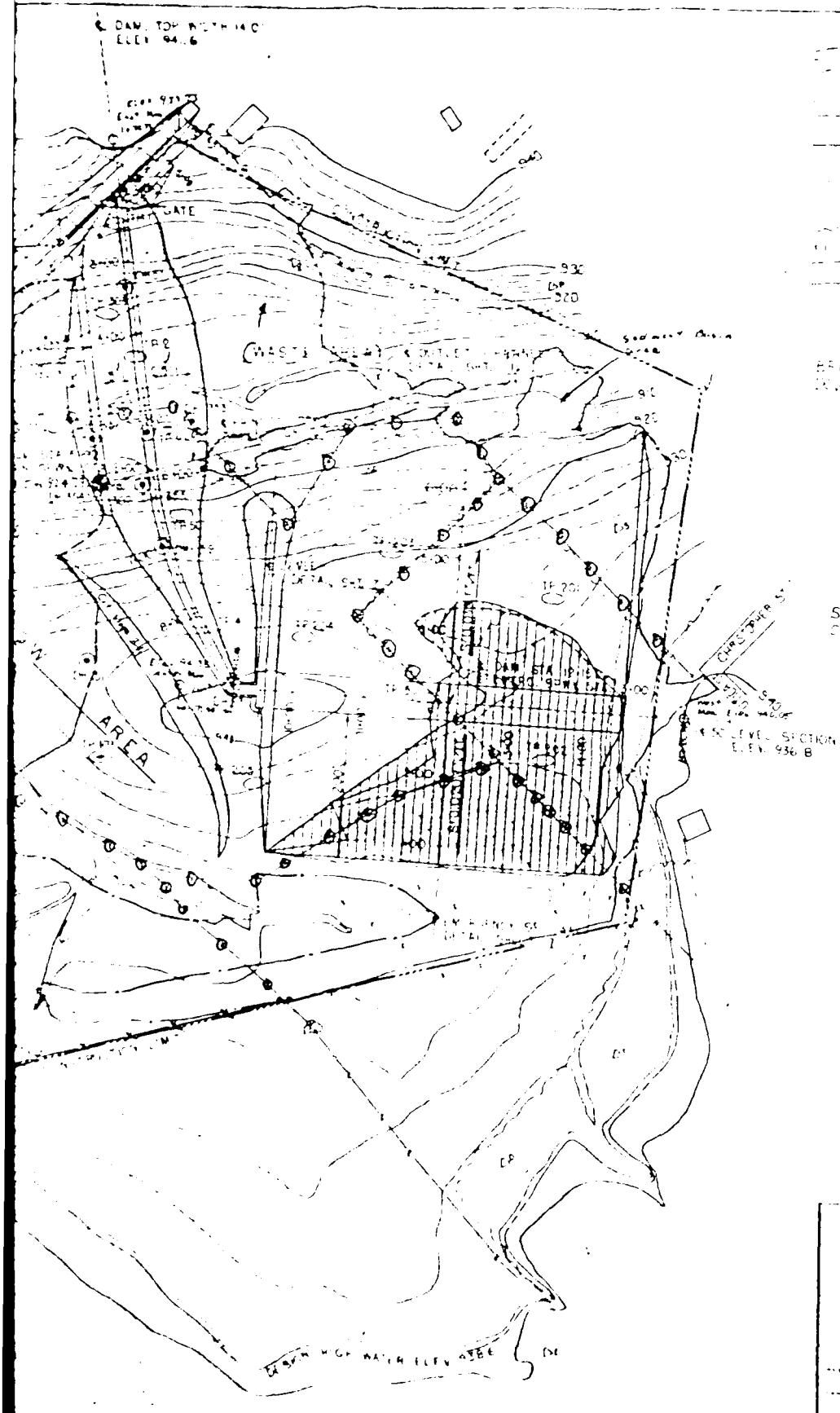
5. WASTE AREAS SHALL BE GRADED TO BE FREE DRAINING AND GENERALLY SMOOTH.

6. CONTRACTOR SHALL CONSTRUCT TEMPORARY BRIDGES, INSTALL CULVERTS, OR USE OTHER METHODS APPROVED BY THE ENGINEER WHERE HAUL ROADS CROSS LIVE STREAMS TO PREVENT POLLUTION OF THE STREAM.

7. CONTRACTOR SHALL SPRINKLE OR APPLY DUST SUPPRESSANTS ON HAUL ROADS AND AT THE BORROW AREA AS REQUIRED TO PREVENT POLLUTION OF THE AIR.

8. ALL MATERIALS, TRASH, AND DEBRIS ANY SHALL BE LOCATED, BURIED, AND DISPOSED OF IN SUCH A MANNER AS TO PREVENT SPILLAGE INTO STREAMS, WELLS, OR SPRINGS.

9. ALL EXCAVATIONS SHALL BE LOCATED IN SUCH A MANNER AS TO PREVENT POLLUTION OF SPRINGS,



BENCH MARK #1

BRASS DISC IN FACE OF HEADWALL AT UPSTREAM END OF CULVERT

QUANTITIES

SEEDING & MULCHING

GROWING SEEDLINGS

SOILS DETAILS

SEE SHEETS 32 & 33 FOR DESCRIPTION OF SOILS AND TEST PITS LOCATIONS SHEETS 2, 3 & 4

SCALE IN FEET

WS-12-72
6/25/73
AS BUILT

PATTERSON, BRIDGES, GREY CREEK WATERSHED PROJECT

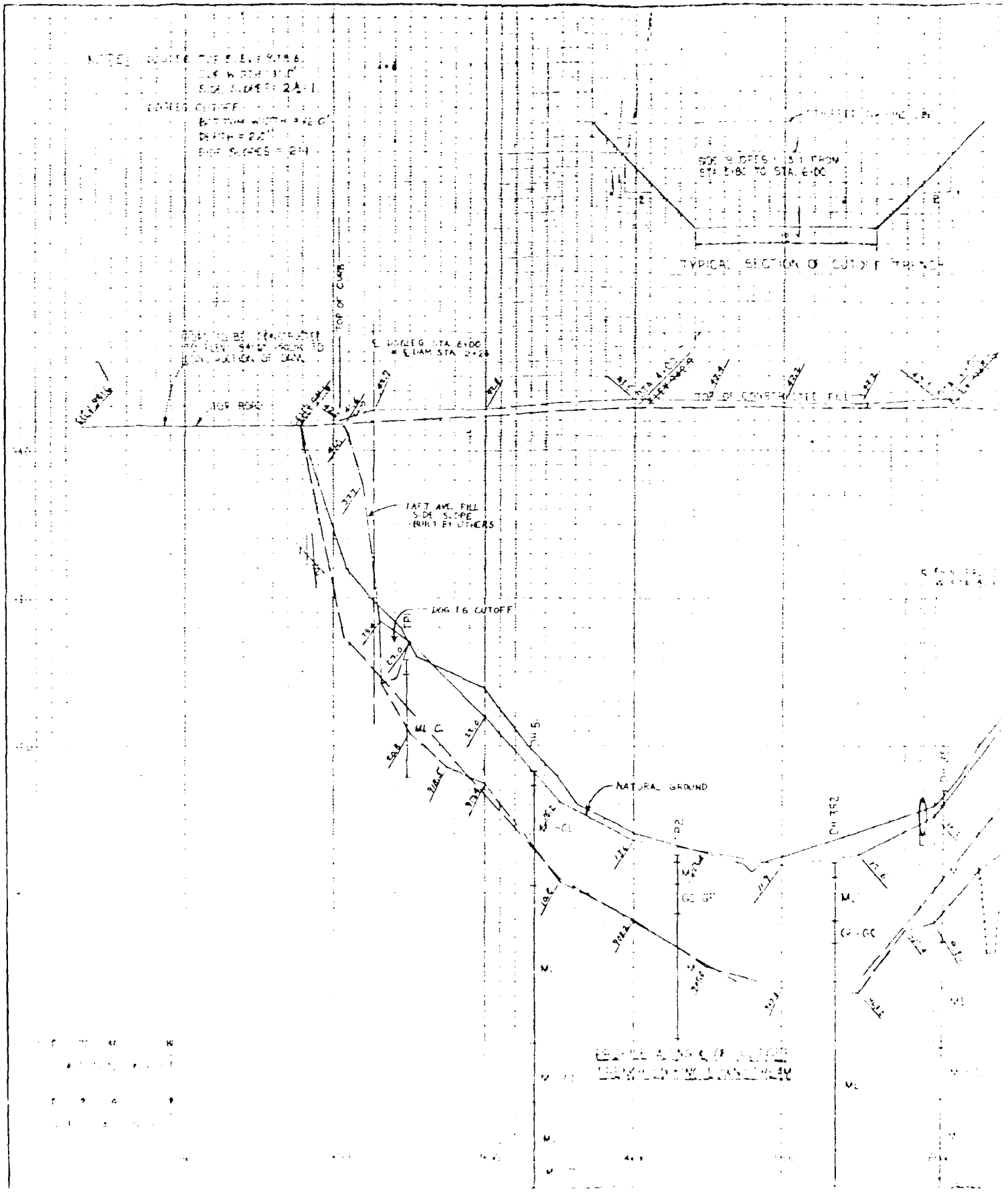
FLOOD WATER RETARDING DAM NO.
BROOME CO., NEW YORK

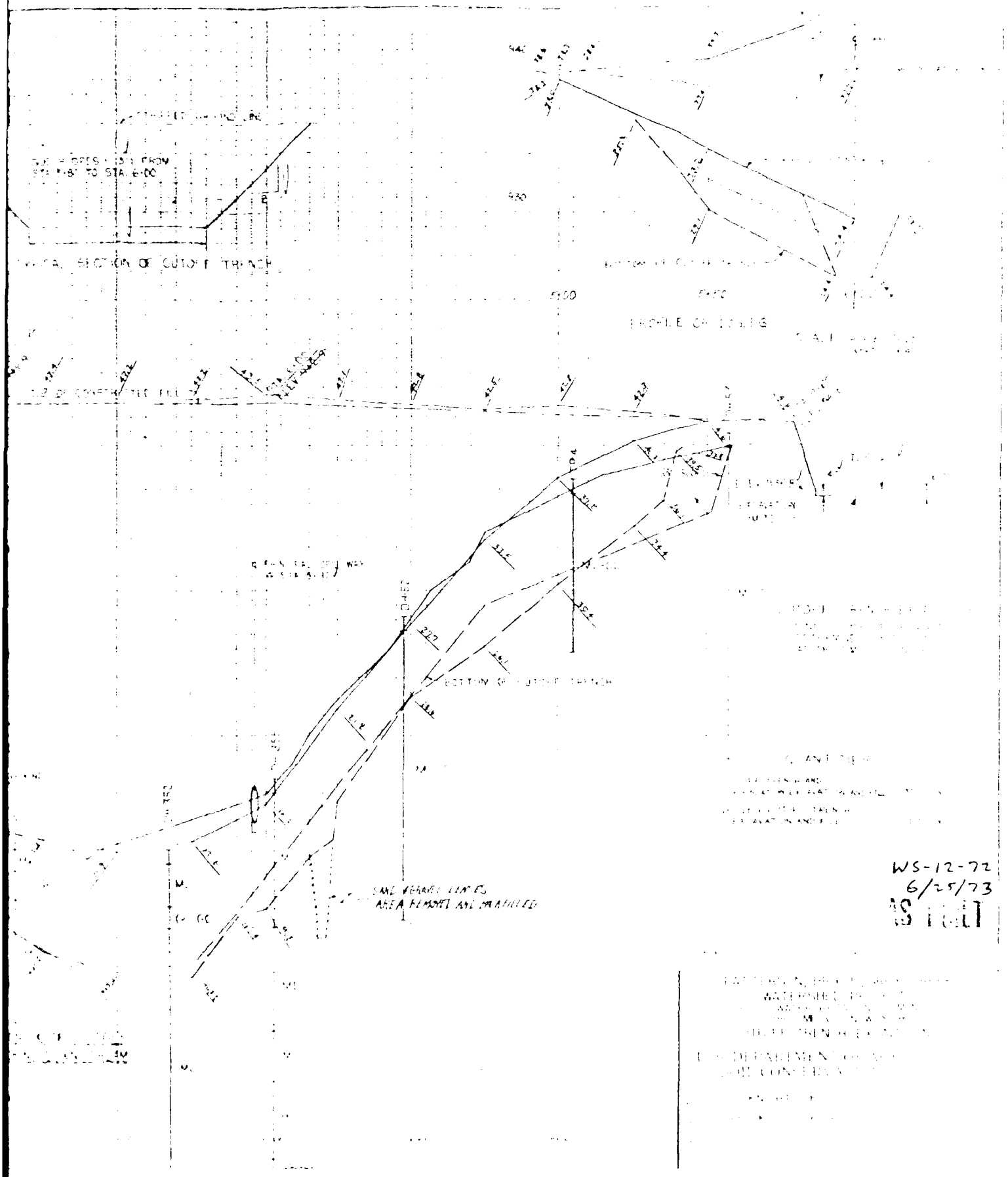
PLAN OF STRUCTURAL WORKS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J. E. POULSEN

D. J. ANGELO


TOP OF CURB
TOP ROAD
TAFT AVE. FILL
SIDE SLOPE
BUILT BY OTHERS
DOG LEG CUTOFF
NATURAL GROUND
TOP OF CONSTRUCTED FILL
TYPICAL SECTION OF CUTOFF TRENCH



WS-12-72
6/25/73

AD-A092 452 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. PATTERSON BRIXIUS GREY CREEK WATER--ETC(U)
SEP 80 G KOCH DACW51-79-C-0001

UNCLASSIFIED NL

2 of 2
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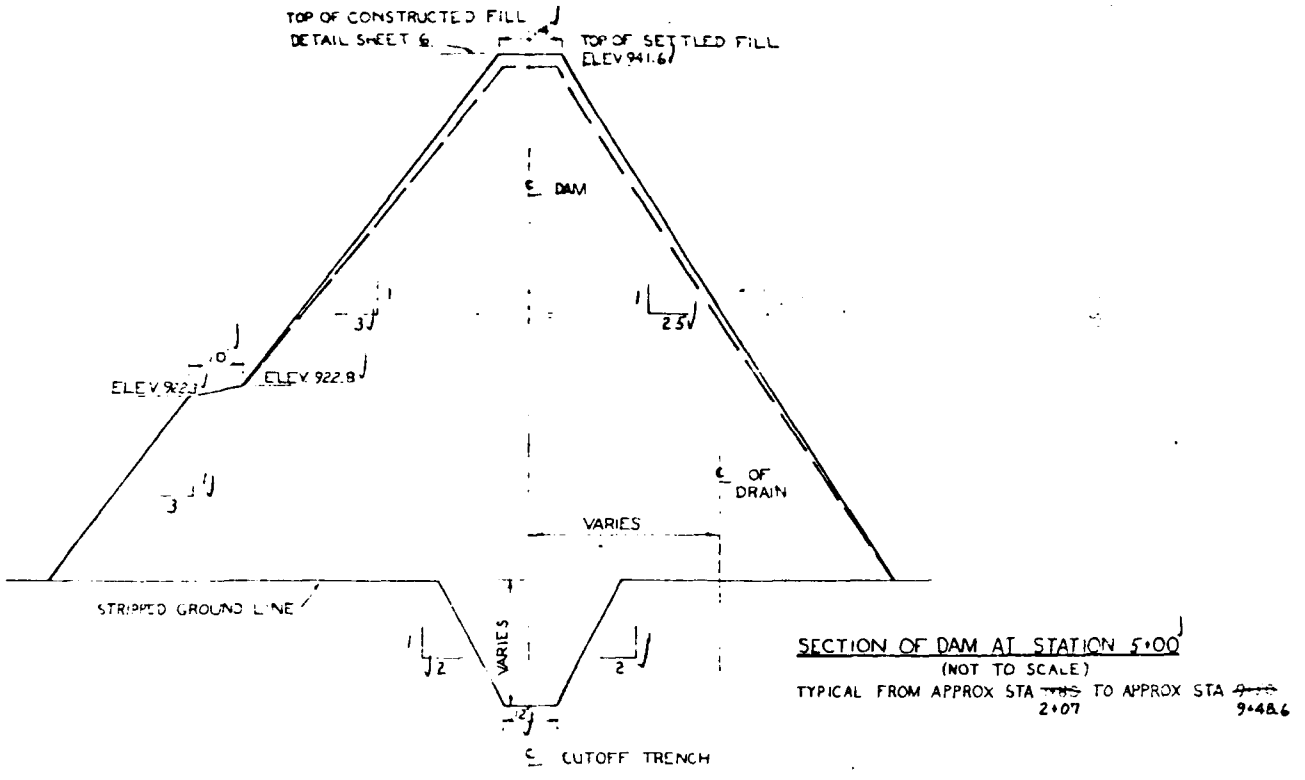
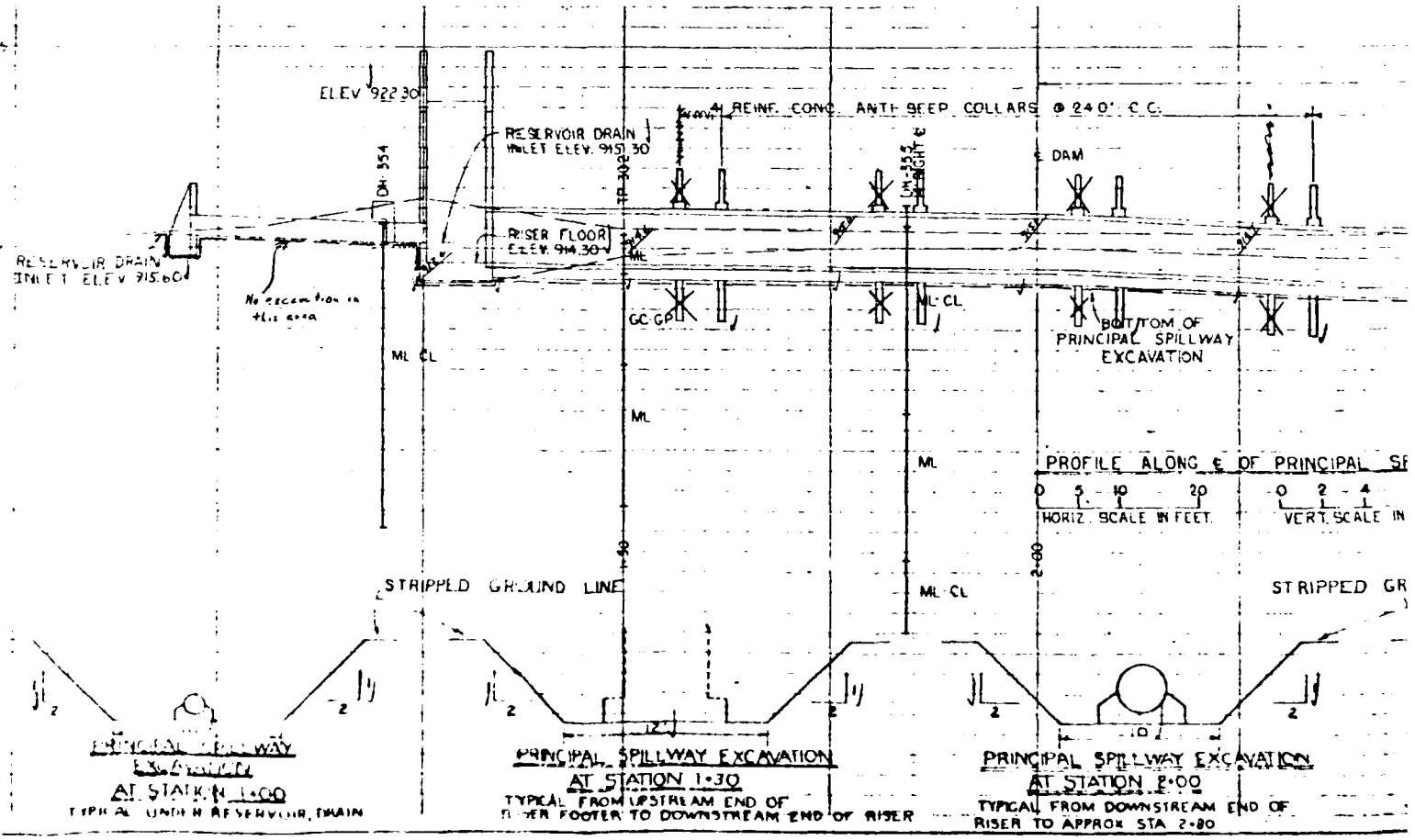


SECTION OF DAM AT STATION 5+00

(NOT TO SCALE)

TYPICAL FROM APPROX STA ~~7+85~~ 2+07 TO APPROX STA ~~9+10~~ 9+48.6



TYPICAL SPILLWAY EXCAVATION AT STATION 1+00

TYPICAL UNDER RESERVOIR DRAIN

PRINCIPAL SPILLWAY EXCAVATION AT STATION 1+30

TYPICAL FROM UPSTREAM END OF RISER FOOTER TO DOWNSTREAM END OF RISER

PRINCIPAL SPILLWAY EXCAVATION AT STATION 2+00

TYPICAL FROM DOWNSTREAM END OF RISER TO APPROX STA 2+80

MATERIAL 1/	EARTH FILL REQUIREMENTS				
	MAX. ROCK SIZE 2/	MAX. LIFT THICKNESS 3/	MIN. REQ. WATER CONTENT 4/	COMPACTION 5/	
				CLASS	DEFINITION
GLACIAL TILL, LACUSTRINE, AND COLLUVIAL MATERIALS REPRESENTED BY: TP - 111 FROM 0.5' TO 10.0' TP - 102 FROM 1.0' TO 14.5' TP - 103 FROM 1.0' TO 11.0' TP - 151 FROM 1.0' TO 19.5'	6"	9"	2 PERCENTAGE POINTS BELOW OPTIMUM	A	95% OF MAXIMUM DENSITY IN A.S.T.M. D-698 METHOD A

1/ THE PLACEMENT TABLE INDICATES ESTIMATED USE OF MATERIAL.

2/ MAXIMUM ROCK SIZE PLACED IN BACKFILL COMPACTED BY MEANS OF HAND TAMPING OR MANUALLY DIRECTED POWER TAMPER OR PLATE VIBRATORS SHALL BE 3".

3/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION.

4/ WATER CONTENT AT TIME OF COMPACTION.

5/ FOR TYPICAL COMPACTION CURVES SEE SHEET 20.

CONSTRUCTION DETAILS

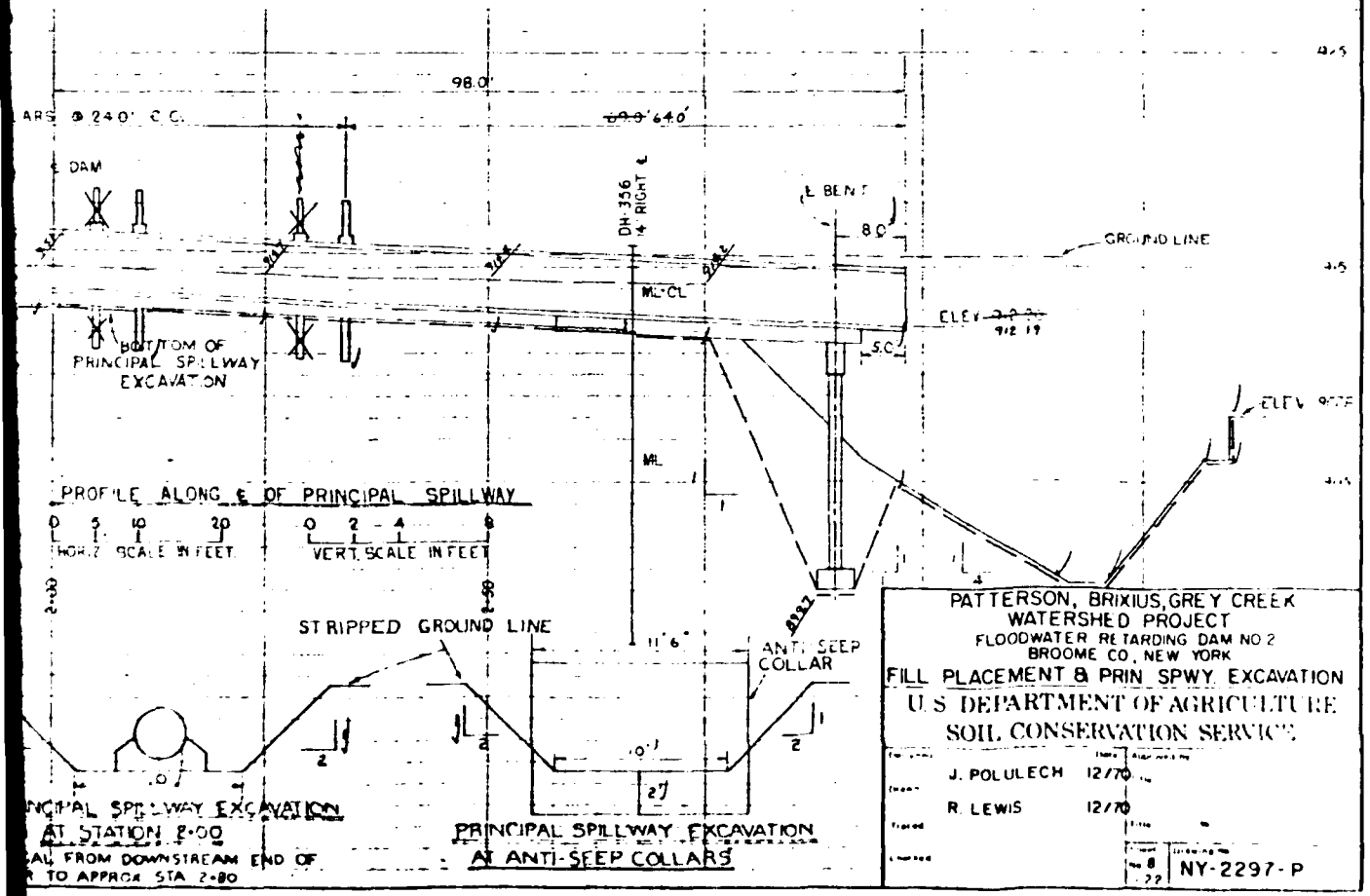
TOPSOIL THAT IS SUITABLE FOR USE AND NOT USED ON THE SPECIFIED AREA OF THE EMERGENCY SPILLWAY SHALL BE INCORPORATED WITHIN THE SLOPES OF THE EARTH FILL AS DIRECTED BY THE ENGINEER.

QUANTITIES

STRUCTURE AND PLUNGE POOL EXCAVATION	607 C.Y.
STRUCTURE BACK FILL	119 C.Y.
EARTH FILL IN DAM	41,216 C.Y.
EARTH FILL IN DOGLEG	131 C.Y.

ATION 5+00
TO APPROX STA 9+48.6

WS-12-72
6/25/73
AS BUILT



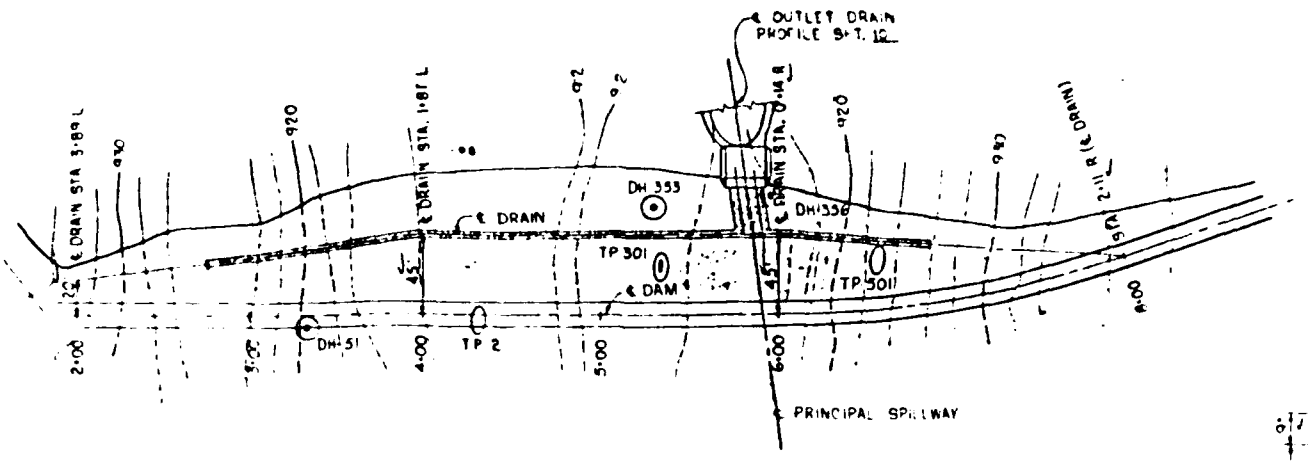
PATTERSON, BRIXIUS, GREY CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
BROOME CO, NEW YORK
FILL PLACEMENT & PRIN SPWY EXCAVATION
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	J. POLULECH	12/70
DRAWN	R. LEWIS	12/70
TRACED		
CHECKED		

NY-2297-P

Form SCS 11[illegible]

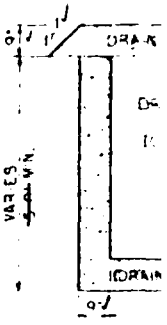
1 2

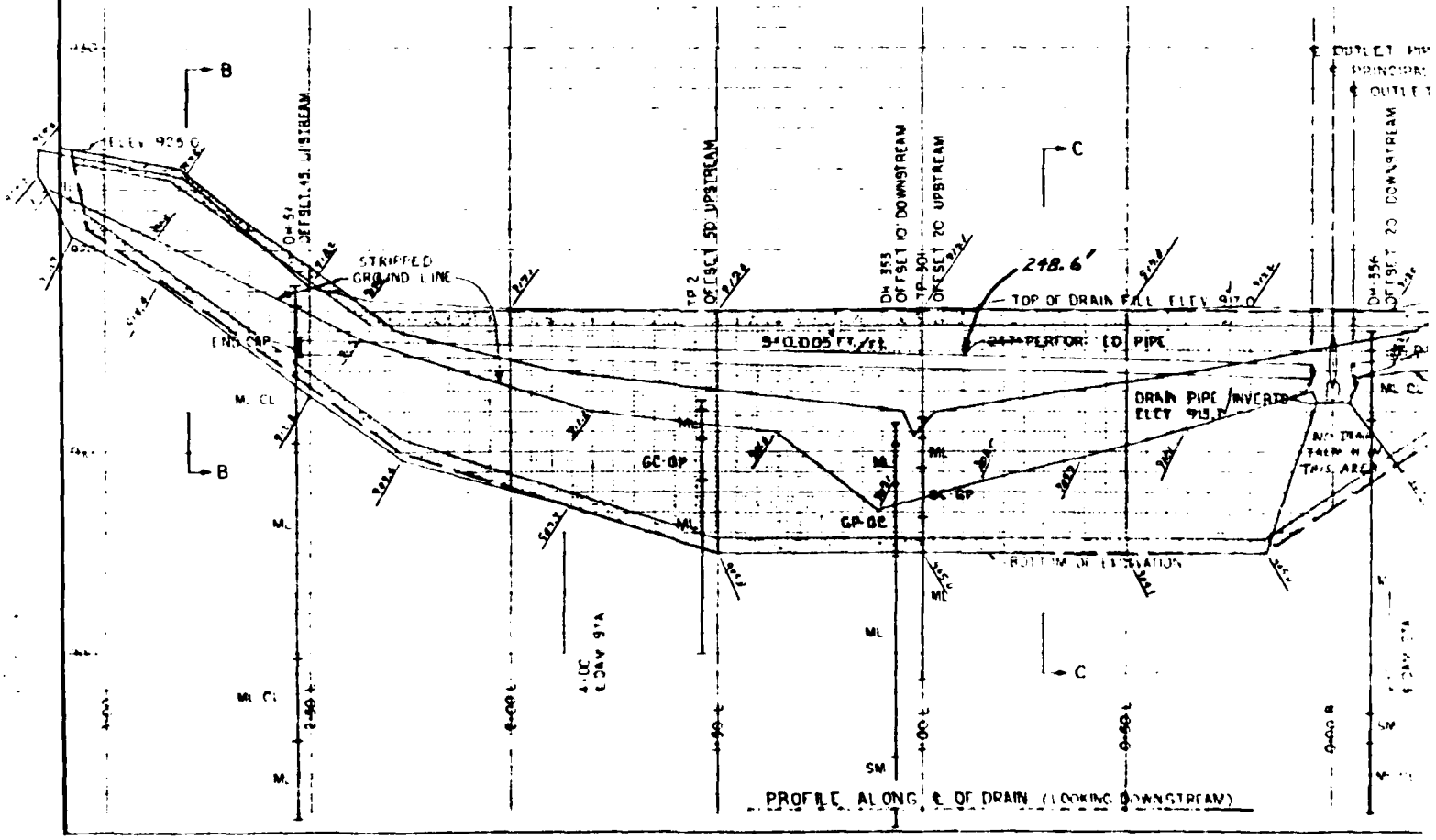


PLAN VIEW

0 20 50 100

SCALE IN FEET

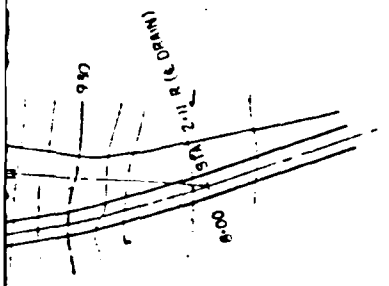


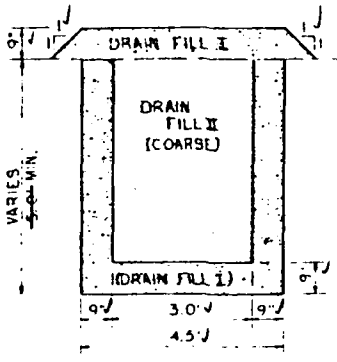


GRAIN SIZE DISTRIBUTION TABLE		
SIEVE NO.	% PASSING	
	DRAIN FILL I (FINE)	DRAIN FILL II (COARSE)
3		100
1		99
3/4		92
3/8	100	69
#4	95 100	34
#8	75 100	12
#16	70 85	5
#30	55 60	
#50	4 30	
#100	1 10	
#200	0 3	

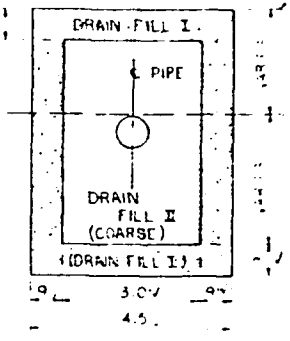
QUANTITY SUMMARY

TOTAL LAID LENGTH INCLUDING BENDS = 370 L.F.



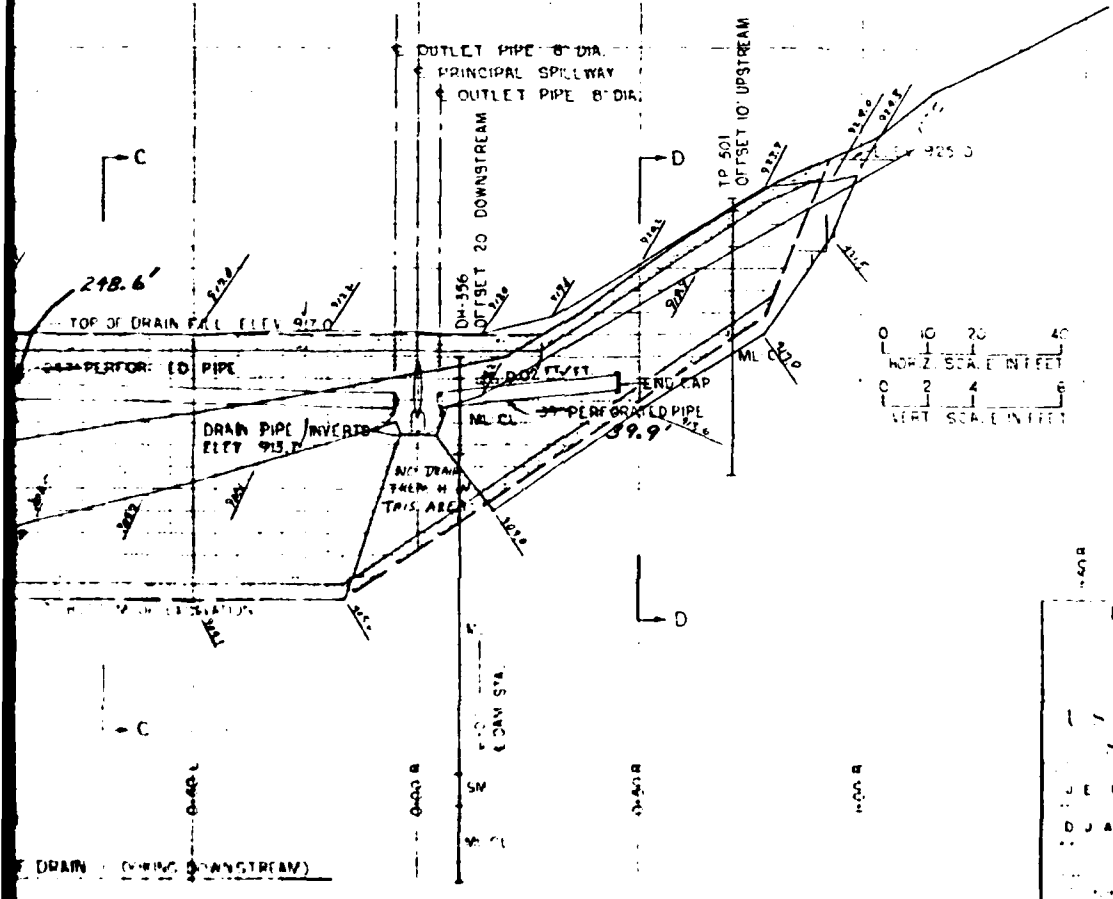


SECTION B-B AND D-D



SECTION C-C

(SECTIONS NOT TO SCALE)

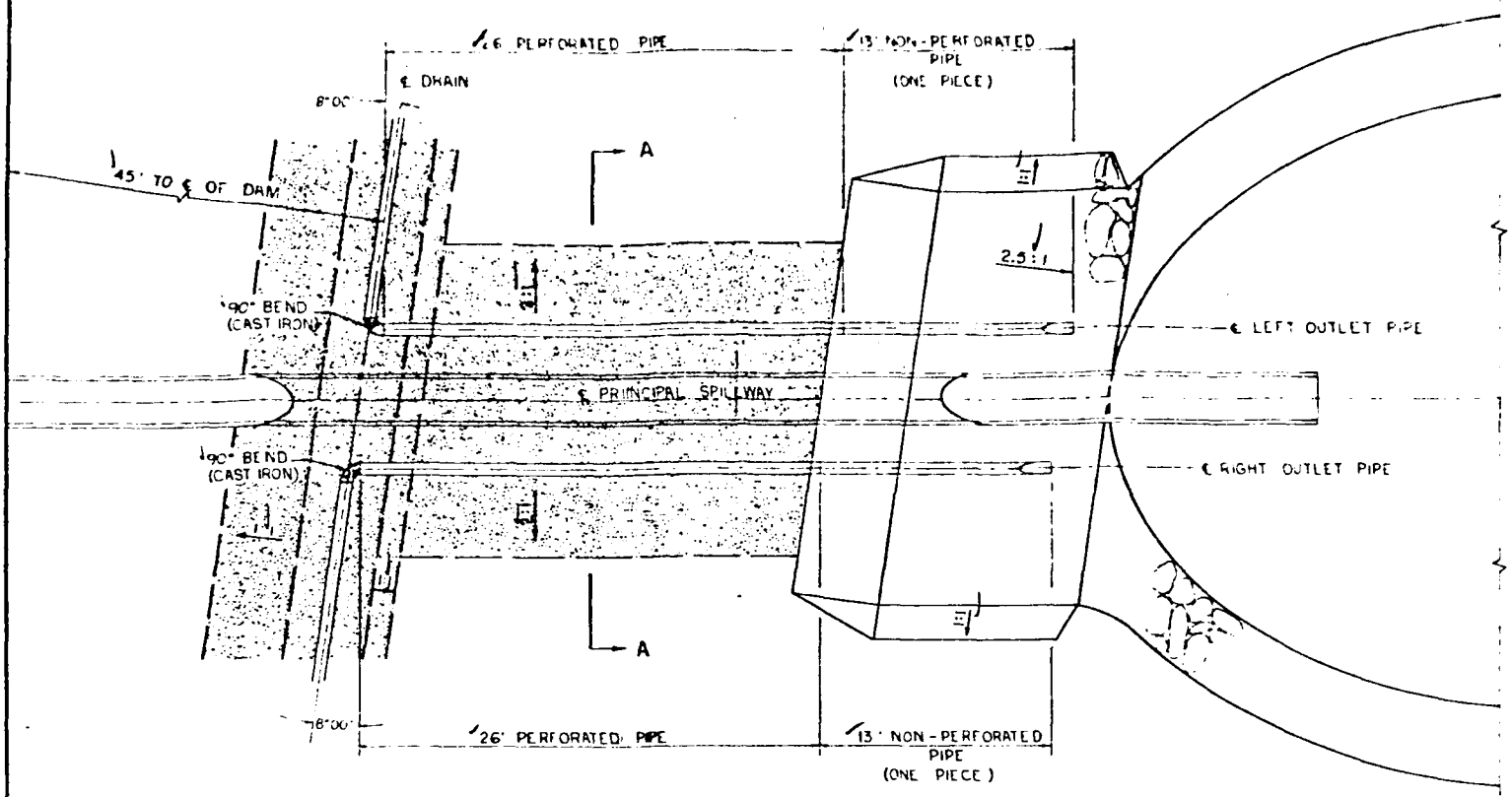


WS-12-72
6/25/73
AS BUILT

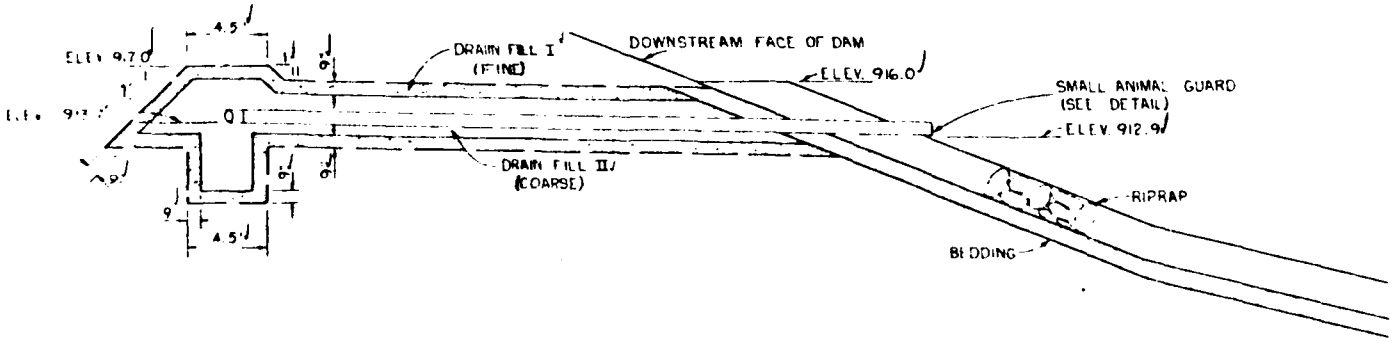
PATTERSON, BRIXIUS, GREY CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 1
BROOME CO. NEW YORK
DRAINAGE SYSTEM
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J. E. PFLUEGER 11/70
D. J. ANGELO 11/70

NY-2297-P



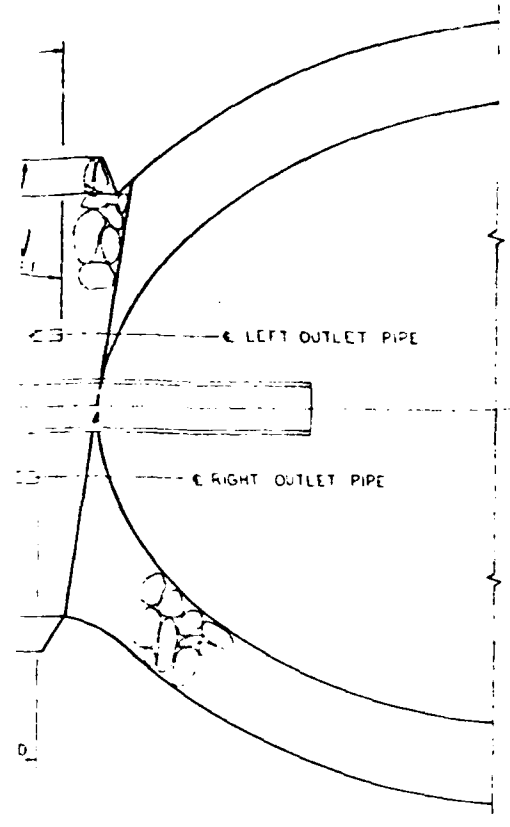
PLAN OF DRAIN OUTLETS

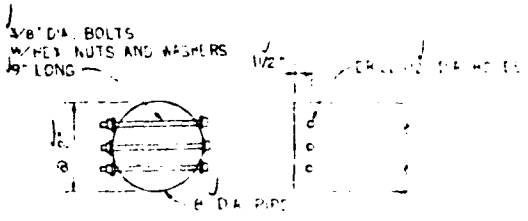


PROFILE ALONG DRAIN OUTLETS

0 5 10

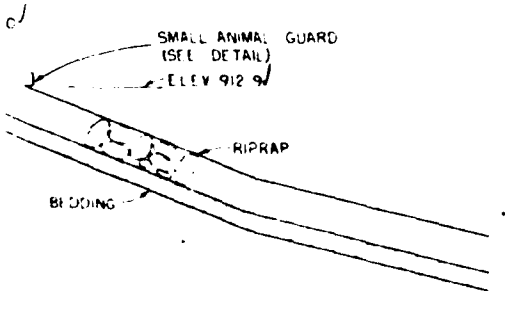
SCALE IN FEET

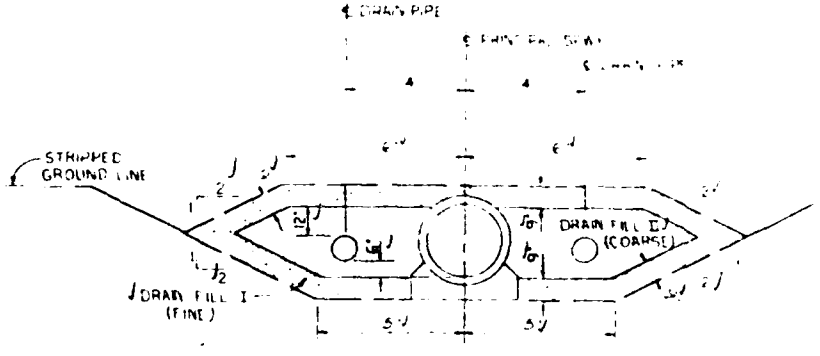




SMALL ANIMAL GUARD DETAILS

0 6" 12"
SCALE





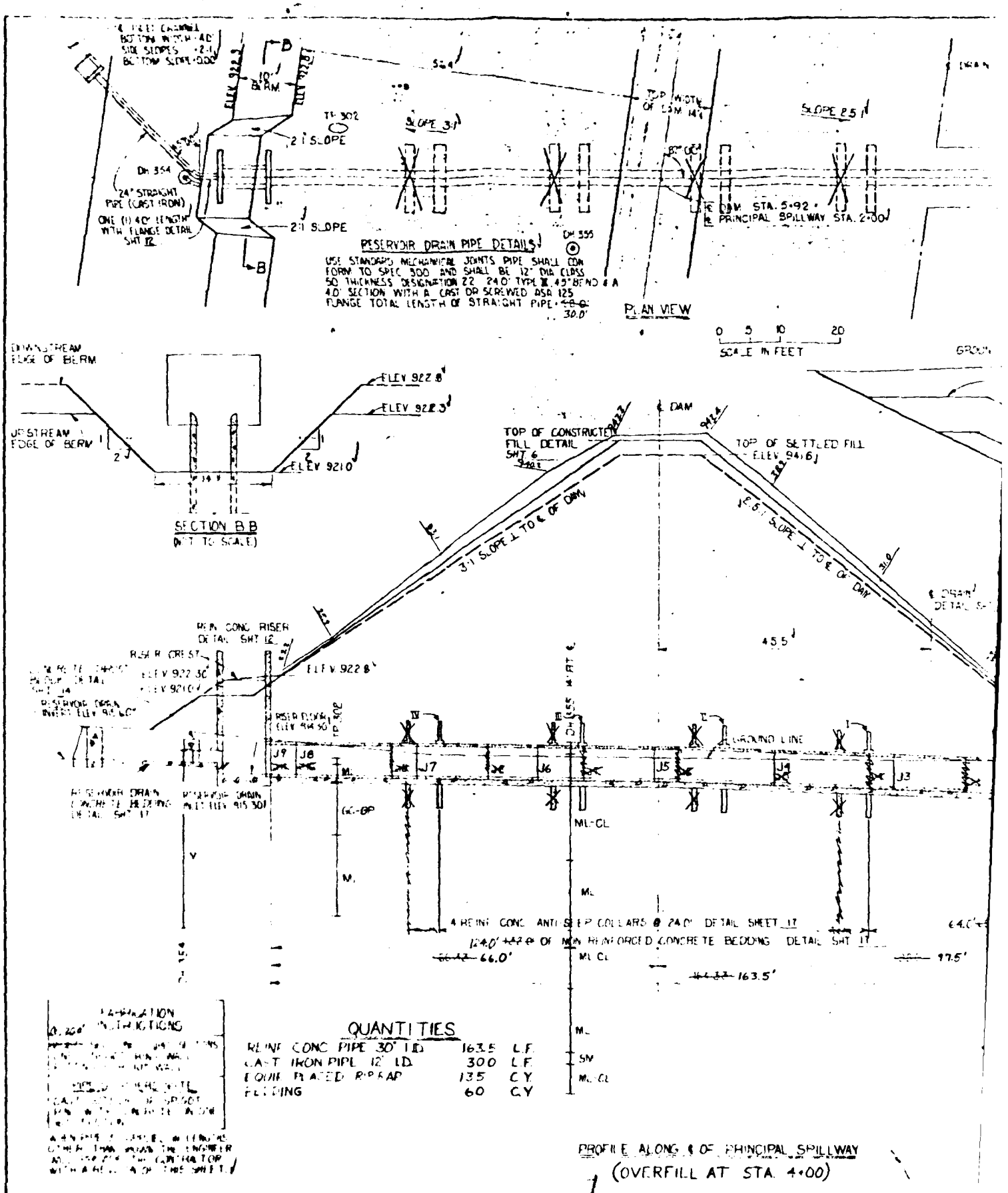
SECTION A-A
(NOT TO SCALE)

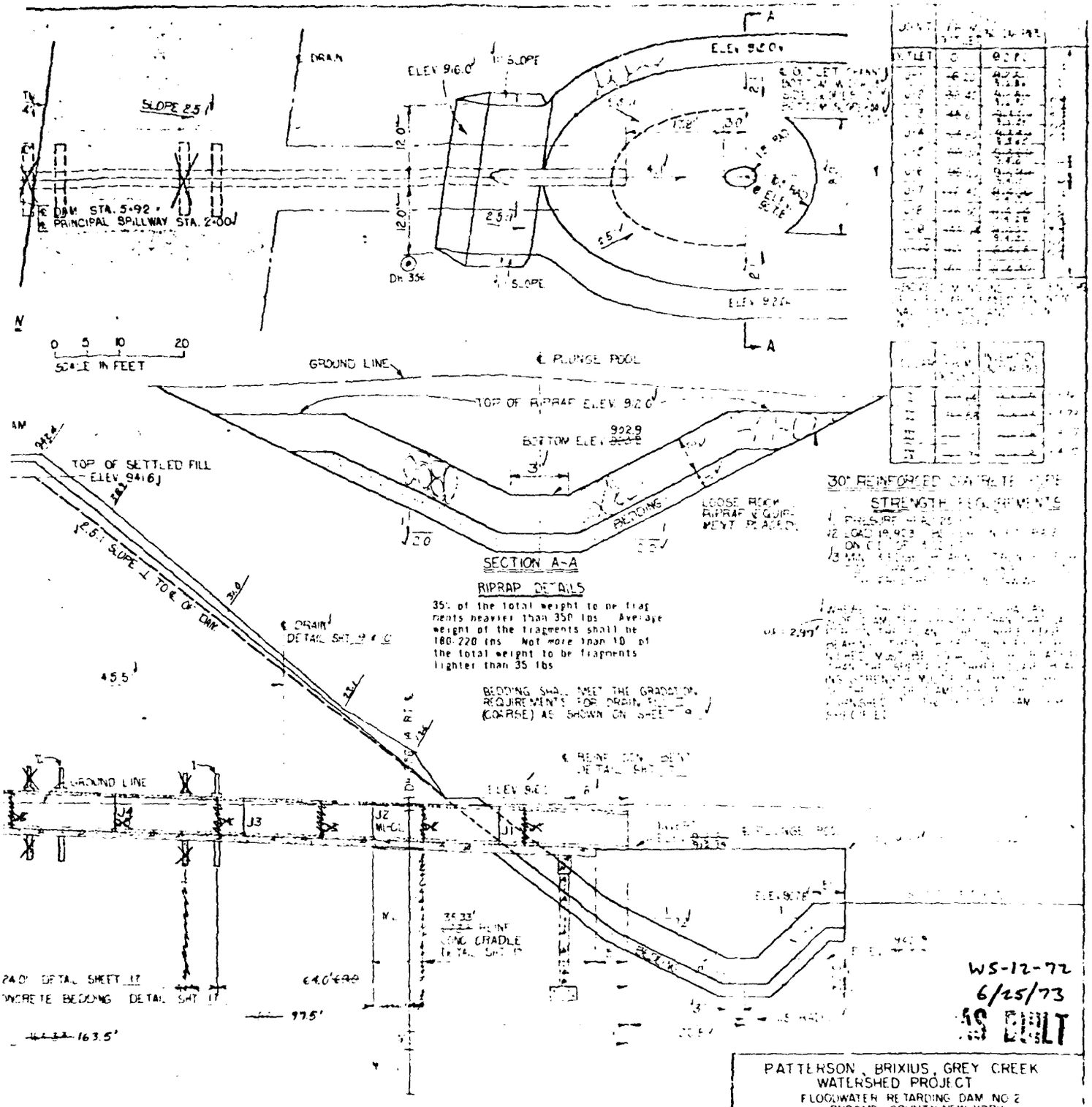
WS-12-72
6/25/73
AS BUILT

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
BROOME CO., NEW YORK
DRAINAGE SYSTEM

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

... J E POLLECH	11/70	
... D J ANGELO	11/70	
... J E P	12/70	NY-2297-P


PLAN VIEW
SCALE IN FEET
0 5 10 20
RESERVOIR DRAIN PIPE DETAILS
USE STANDARD MECHANICAL JOINTS PIPE SHALL CONFORM TO SPEC 300 AND SHALL BE 12" DIA CLASS 50 THICKNESS DESIGNATION 22 24.0' TYPE II 45° BEND & A 4.0' SECTION WITH A CAST OR SCREWED ASA 125 FLANGE TOTAL LENGTH OF STRAIGHT PIPE 30.0'
24" STRAIGHT PIPE (CAST IRON) ONE (1) 4.0' LENGTH WITH FLANGE DETAIL SHT 12
DH 354
DH 355
TP 302
2:1 SLOPE
SLOPE 3:1
SLOPE 2.5:1
TOP WIDTH OF DAM 14'
℄ DAM STA. 5+92
℄ PRINCIPAL SPILLWAY STA. 2+00
SECTION B-B
(NOT TO SCALE)
DOWNSTREAM EDGE OF BERM
UPSTREAM EDGE OF BERM
ELEV 922.8
ELEV 922.3
ELEV 921.0
TOP OF CONSTRUCTED FILL DETAIL SHT 6
TOP OF SETTLED FILL ELEV 941.6
3:1 SLOPE ⊥ TO ℄ OF DAM
2.5:1 SLOPE ⊥ TO ℄ OF DAM
REIN CONC RISER DETAIL SHT 12
RISER CREST ELEV 922.30
RISER DOOR ELEV 914.50
RESERVOIR DRAIN INVERT ELEV 915.30
RESERVOIR DRAIN CONCRETE BEDDING DETAIL SHT 17
GROUND LINE
J1
J2
J3
J4
J5
J6
J7
J8
J9
ML-CL
4 REIN CONC ANTI SEEP COLLARS @ 24.0' DETAIL SHEET 17
124.0' LF OF NON REINFORCED CONCRETE BEDDING DETAIL SHT 17
66.0'
163.5'
97.5'
64.0'
455'
QUANTITIES
REINF CONC PIPE 30" I.D. 163.5 L.F.
CAST IRON PIPE 12" I.D. 300 L.F.
EQUIP PLACED RIPRAP 135 C.Y.
FILTER 60 C.Y.
PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY
(OVERFILL AT STA. 4+00)



NG ℄ OF PRINCIPAL SPILLWAY
FILL AT STA. 4+00)

MATERIAL DESCRIPTIONS

WELLSVILLE CANYON

A

Silt-clayey: maximum particle size 1.0", trace to 25% over 4": 25-30% gravel, 20-25% sand, 50-55% fines; slightly plastic (LL=24-25); PI=4-6); trace above W.T. gray brown below, moist, essentially impermeable; hard, n=131, averages 31; homogeneous; glacial till; samples 111.1, 102.3. (ML-CL)

B

Silt-clayey; maximum particle size 1.25", trace of gravel, 5-15% sand, 85-95% fines; slightly plastic (LL=24-26, PI=3-5); brown and gray with mottling; moist; essentially impermeable; very stiff, n=11-42, average 27; stratified on hillside, homogeneous on floodplain; lacustrine and colluvial; samples 103.1, 301.3. (ML)

C

Gravel-clayey; maximum particle size 3", 5" @ 3' 55-60% gravel, 30-35% sand, 10-15% fines; fines are medium plastic (LL=29, PI=8); brown; saturated; highly permeable; loose to medium, n=10, somewhat stratified; alluvium; sample 301.1. (GC-GP)

D

Silt-clayey; maximum particle size 2.0", trace of cobbles, 5-10% gravel, 5-10% sand, 75-80% fines; non-plastic; gray; moist to saturated; essentially impermeable; stiff, n=3+, average 15; stratified with 1/8" beds of sand; lacustrine; samples 301.2, 3524.1 (undisturbed). (ML)

E

Sand-silty; maximum particle size .75", 0-5% gravel, 80-85% sand, 10-15% non plastic fines; gray-brown; saturated; highly permeable — artesian flow in one hole, firm, n=36, average 25; possible stratification; lacustrine; sample 353.12-13. (SM)

F

Topsoil-organic; maximum particle size 3", 10-20% coarse material; slightly plastic; moist; moderate to high permeability; soft, n=1-30 average 6; homogeneous; residual.

LOGS OF PIT LOGS

TP #1, [illegible] OF D.M., 925.5, PCF, 10/29/68

0.0	1.0	Material F (Topsoil)
1.0	4.0	" A (ML-CL)

TP #2, [illegible] OF D.M., 932.0, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	2.0	" B (ML)
2.0	4.0	" C (GC-GP)
4.0	12.5	" B (ML)

NOTE: Water running in at 4.0'.

TP #3, [illegible] PCF

TP #4, [illegible] OF D.M., 931.5, PCF, 10/29/68

0.0	1.0	Material F / fill (Topsoil)
1.0	12.0	" A (ML-CL)

NOTE: Stonier than usual; 3" over 6".

TP #[illegible] [illegible] OF D.M., 931.1, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	7.0	B (ML-CL)

NOTE: Water very slowly seeping in bottom of hole.

TP #[illegible] [illegible] 924.[illegible], PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	12.0	(ML-CL)

NOTE: Hole caved badly after digging.

TP #[illegible] [illegible] 924.9, PCF, 10/29/68

0.0	1.0	Material F (Topsoil)
1.0	10.5	Material (ML-CL)

TP #[illegible] [illegible] 933.9, PCF, 10/29/68

0.0	1.0	Material F (Topsoil)
1.0	4.5	" A (ML) D.S. 103.1
4.5	11.0	" A (ML-CL)

NOTE: Boulder at 10.0'.

TP #104, [illegible] AREA, 934.4, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	8.0	Material A (ML-CL)

NOTE: 25% over 6" hole remained dry during digging.

TP #105, [illegible] AREA, 928.4, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	7.5	Material A (ML-CL)

TP #106, [illegible] AREA, 933.3, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	8.0	Material A (ML-CL)
8.0	10.0	Material B (ML)

NOTE: Some water in the bottom of hole.

TP #107, [illegible] AREA I, 934.2, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	10.0	Material A (ML-CL)

TP #108, [illegible] AREA B, 926.5, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	10.0	Material A (ML-CL)

TP #109, [illegible] AREA B, 932.1, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	10.0	Material A (ML-CL)

TP #110, [illegible] AREA B, 932.6, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	10.0	Material A (ML-CL)

TP #111, [illegible] AREA B, 925.9, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	10.0	Material A (ML-CL)

D.S. 111.1/5.0'.

TP #201, [illegible] SPILLWAY, 932.9, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	7.0	Material A (ML-CL)

NOTE: Some water entering pit at 2.0'.

TP #202, [illegible] SPILLWAY, 933.4, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	7.0	Material A (ML-CL)

NOTE: Some water entering hole at 2.0'.

TP #203, [illegible] SPILLWAY, 932.0, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	7.5	Material A (ML-CL)

NOTE: Water entering hole at bottom of pit.

TP #204, [illegible] SPILLWAY, 931.1, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	7.0	Material A (ML-CL)

NOTE: Some water entering bottom of hole.

TP #205, [illegible] SPILLWAY, 930.2, PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	6.0	Material A (ML-CL)

NOTE: Water leaving gravel pocket at 3.0' at N end of pit.

6.0 12.0 Material A (ML)

TP #206, [illegible] SPILLWAY, 931.[illegible], PCF, 10/29/68

0.0	1.0	Material F (Topsoil)
1.0	2.5	Material B (ML)
		D.S. 301.3
2.5	5.0	Material C (GC-GP)
		D.S. 301.1
5.0	11.0	Material B (ML)
		D.S. 301.2

NOTE: Water running in hole at 5.0'. Rose 1.0' in 1 hour.

TP #207, [illegible] SPILLWAY, 931.[illegible], PCF, 10/29/68

0.0	0.5	Material F (Topsoil)
0.5	2.0	Material B (ML)
2.0	6.5	Material C (GC-GP)
6.5	11.5	Material B (ML)

NOTE: Water running in hole at 4.0'.

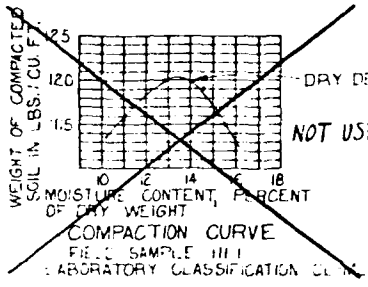
TP #208, [illegible] SPILLWAY, 934.[illegible], PCF, 10/29/68

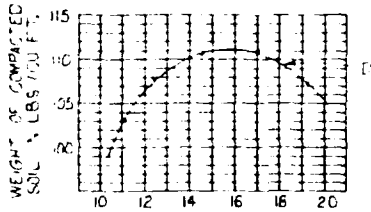
0.0	1.0	Material F (Topsoil)
1.0	2.0	Material B (ML)
2.0	5.0	Material C (GC-GP)
5.0	10.0	Material B (ML)

TP #301, [illegible] LINE, 923.2, PCF, 10/29/68

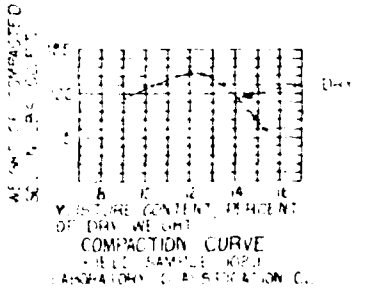
0.0	0.5	Material F (Topsoil)
0.5	12.5	Material B (ML-CL)

NOTE: Water entering hole at 3.0. Level 9.5 after 1.5 hrs.





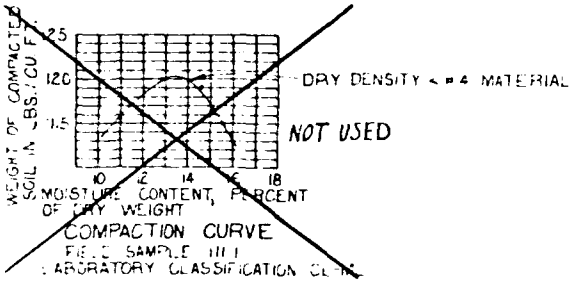
NOTE: [illegible] DEVELO



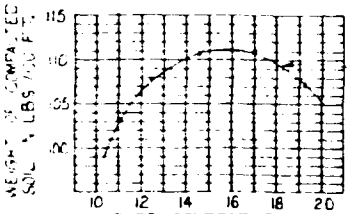
TP #501. DRAIN LINE. 921.2. EST. 10/26/68

0.0	0.5	Material F (Topsoil)
0.5	12.5	Material F (ML-CL)

NOTE: Water entering hole at 3.0.
Level 9.5 after 1.5 hrs.

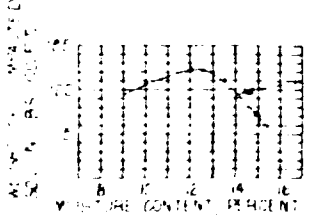


COMPACTION CURVE
FIELD SAMPLE 101.1
LABORATORY CLASSIFICATION CL-ML



COMPACTION CURVE
FIELD SAMPLE 103.1
LABORATORY CLASSIFICATION CL-ML

NOTE: ON SITE PROCTOR CURVES DEVELOPED DURING CONSTRUCTION



COMPACTION CURVE
FIELD SAMPLE 104.1
LABORATORY CLASSIFICATION CL

WS-12-72
6/25/73
AS BUILT

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
BROOME CO NEW YORK
LOGS OF TEST HOLES

U.S. DEPARTMENT OF AGRICULTURE
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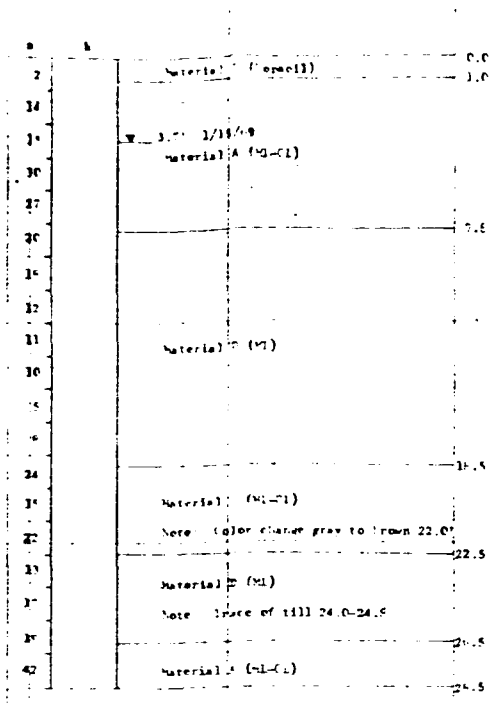
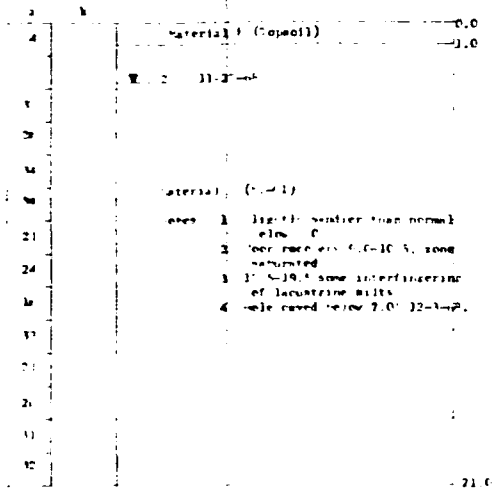
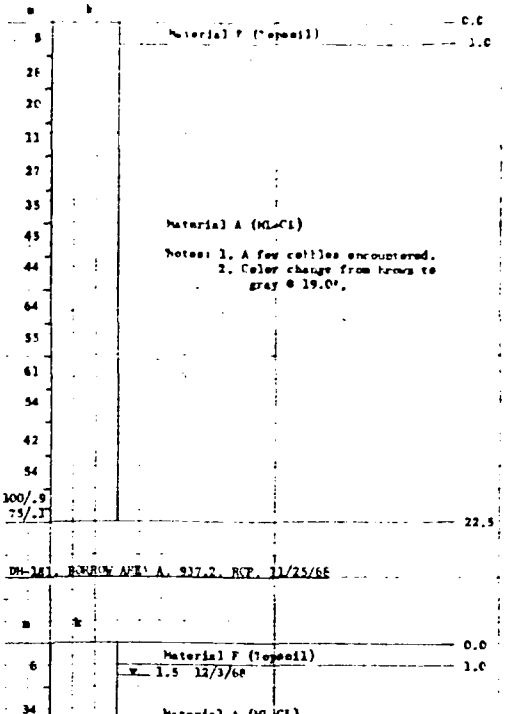
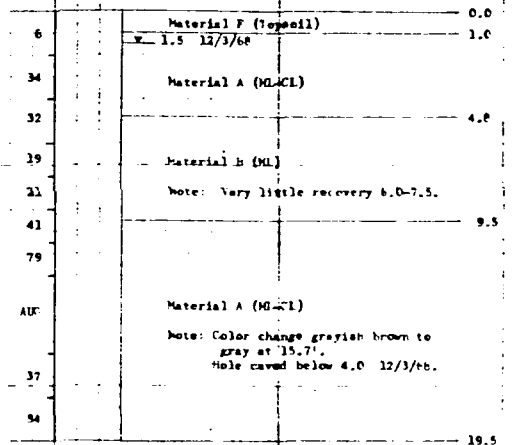


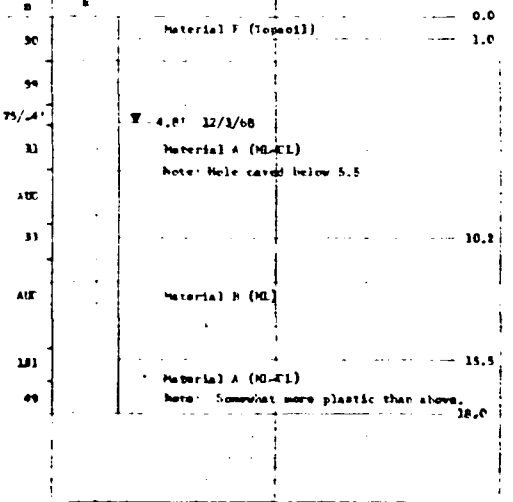


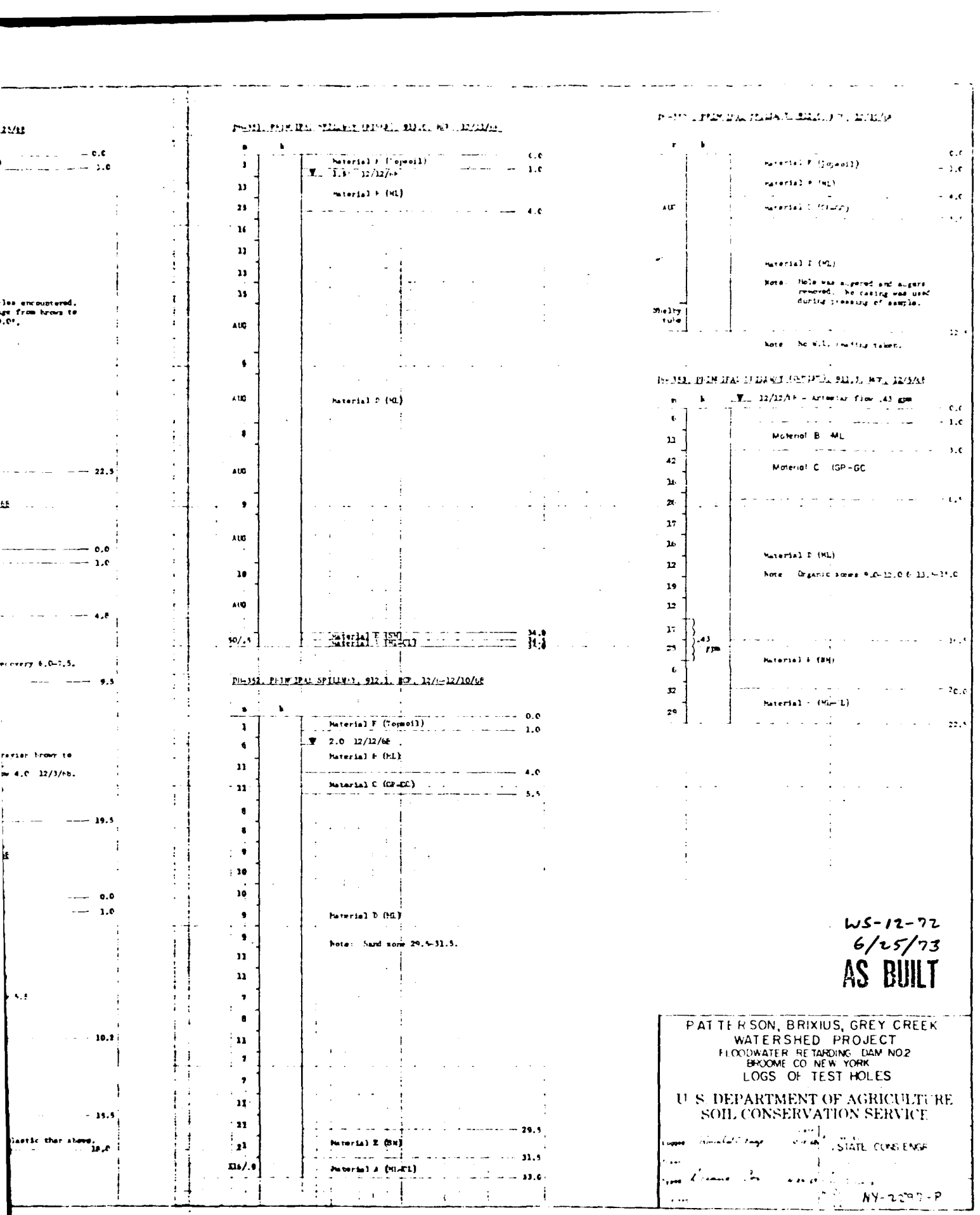


DH-181, BORROW AREA A, 937.2, RCP, 11/25/68



DH-155, BORROW AREA A, 933.7, RCP, 11/27/68





WS-12-72
6/25/73
AS BUILT

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO2
BROOME CO NEW YORK
LOGS OF TEST HOLES

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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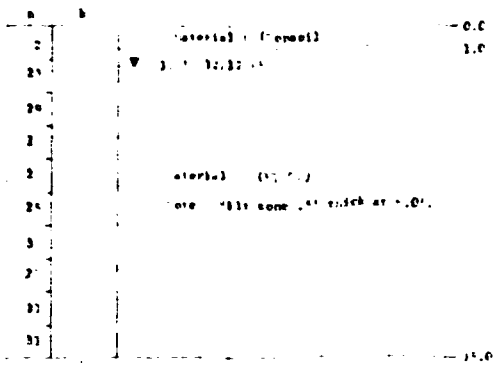
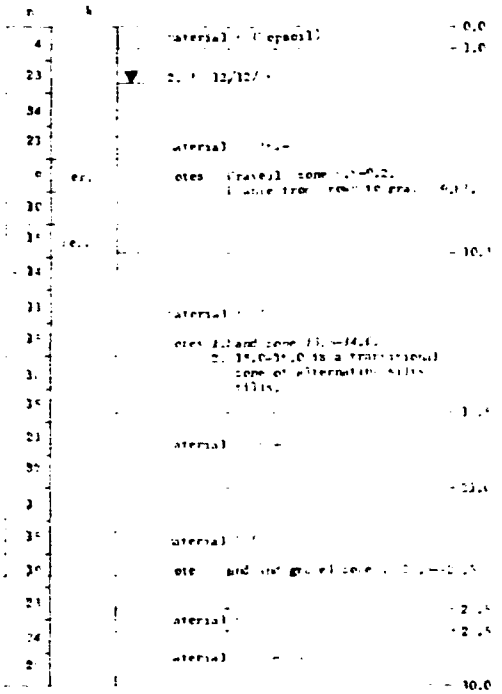
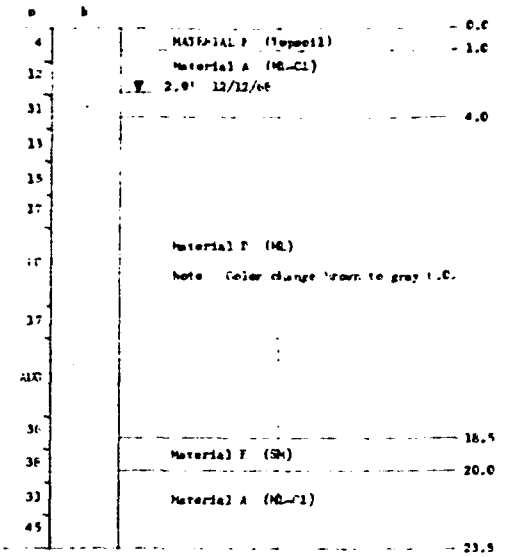
NY-22[illegible]-P






Material F (Topsoil)
Material A (ML-CL)
Material F (ML)
Note Color change brown to gray 1.0.
Material F (SM)
Material A (ML-CL)

— 918.0, PCF, 22.6/8"

- 0.0
(topsoil) - 1.0
(B-C1)

- 4.0

(B)

(Change brown to gray C.C.

- 18.5
(B)
- 20.0
(C-C1)

- 23.5

Test Hole No. [illegible]

Test Pit [illegible]

(Center) [illegible]
Across Area [illegible]
Embankment Spillway [illegible]
Centerline of [illegible]
Outlet Structure [illegible]
Outlet Canal [illegible]
Drain Line [illegible]
Other [illegible]

IDENTIFICATION AND CLASSIFICATION OF SOILS

GW Well graded gravel, gravel-sand mixtures, little or no fines
GP Poorly graded gravels
GM Silty gravels, gravel-sand-silt mixtures
GC Clayey gravels, gravel-sand-clay mixtures
SW Well graded sands, gravelly sands, little or no fines
SP Poorly graded sands
SM Silty sands, poorly graded sand-silt mixtures
SC Clayey sands, poorly graded sand-clay mixtures
ML Silts, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
CL Clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL Organic silts and organic silty clays of low plasticity
MH Micaceous clays, diatomaceous fine sandy or silty soils, elastic silts
CH Clays of high plasticity, fat clays
OH Organic clays of medium to high plasticity

Note: Classification shown is that of the predominant material based on laboratory tests on sample retained on the No. 4 sieve. Estimated percentages of materials from normal are given.

Key to Drill Hole Symbols

Drill Hole Log

DBS RB
AWX
NX
4-1/2 dia.

Other Abbreviations & Symbols

- Disturbed sample
- Undisturbed sample
- Test Pit Logged Only
- Test Pit Logged & Sampled
- Drill Hole Logged only
- Drill Hole Logged & Sampled
- Water Level at time indicated

WS-12-72
6/25/73
AS BUILT

FOR IN-SERVICE USE ONLY

PATTERSON, BRIXIUS, GREY CREEK
WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
BROOME CO NEW YORK
LOGS OF TEST HOLES

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

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